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AVIATION SAFETY LETTER

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The Challenge of Managing Wildlife Hazards at General Aviation Airports

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Learn from the mistakes of others;
you'll not live long enough to make them all yourself ...

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Canada

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GUEST EDITORIAL

Improving aviation safety is the reason for the collaboration between Transport Canada and the aviation industry. That collaboration is clear in the principles of safety management systems (SMS), one of Transport Canada's top priorities.

SMS builds on existing rules and regulations.

SMS is a risk- and performance-based systemic approach to reducing risk and threats. Introduced in 2001 in Civil Aviation within Transport Canada, SMS is a new way of doing business—a proactive way to prevent problems *before they occur*. SMS builds on existing rules and regulations to help improve on the enviable record of aviation safety that Canadians know today.

While safer operations are the ultimate goal, SMS is about more than that. Many companies have declared publicly that SMS is good business. The ability to better manage issues before they become problems not only improves safety but also has a positive impact on the bottom line by avoiding the costs associated with incidents and accidents and loss of company credibility.

Full implementation of SMS is a priority for Transport Canada. Surprising? No. A properly executed SMS improves safety, and saves time and money. Most importantly, SMS helps save lives. And that is ultimately Transport Canada's goal. And so, I have committed all of the Safety and Security Directorates to implementing SMS with their stakeholders. There is both strong commitment and genuine enthusiasm for this transformative approach, especially among the new generation of management at Transport Canada.

Full implementation of SMS is a priority for Transport Canada. SMS improves safety, and saves time and money. Most importantly, SMS helps save lives.

Of course, full implementation of SMS principles and practices requires a shift from old thinking to new thinking, and this requires a significant culture change. With our stakeholders, culture change must permeate throughout the Canadian and international aviation enterprises, and the individual operators.

SMS needs the support of effective leadership and buy-in across an organization. Engagement and collaboration are key to the success of SMS. A collaborative environment is essential. We must continue to work together to create the culture change necessary for SMS to reach its full potential.

We must maintain our vision and focus on SMS. There is a tremendous amount of work already accomplished, and more still to do. Let's work on this together.

Marc Grégoire
Assistant Deputy Minister
Safety and Security

Simulating the 180° turn to runway

We pilots have all heard that the 180° turn back to the runway is risky. I decided to try that scenario on my home computer with a flight simulator. Here is the scene: Meig's Field, Chicago; altitude 592 ft; single 4 000 ft runway; Cessna Skylane with retractable gear. I did a succession of engine failures at different heights above ground level—200, 300, 400 ft, etc.—with winds ranging from no headwind to 30 mph.

The "typical flight" would start with a full power takeoff from the beginning of the runway, then I would climb out to approximately 400 ft, chop the throttle, establish glide and attempt to return to the field. I did this repeatedly, with different headwinds, giving myself different heights when the engine "failed." Here is the result: I could not make it back if the engine failed below 500 ft, and even at that height, some headwind was necessary to keep me close to the field. Even trying it at 600 or 700 ft was difficult; the headwind that might keep me close to the field might also blow me past the end of the runway.

I invite anyone with a quality flight simulator on their computer to try this out at home. You will find yourself flying into the ground most of the time, but sometimes an ideal combination of enough height and wind will get you back in one piece. In a REAL failure soon after takeoff, hope for height and luck in abundance. The "land straight ahead" option is the best in this truly unfortunate situation. Having tried the simulation, I cannot conceive that a pilot in such a stressful situation would be capable of the assessment necessary to make "The Decision" to return to the runway.

Joe Foster
Toronto, Ont.

Thank you Mr. Foster. This is a recurring notion which is important for all to reflect on, and prepare for, at each and every takeoff. Expecting the unexpected can make a world of difference. Discuss this subject with flight instructors and peers. Also, keep in mind that any successful landing made using a flight simulator may not translate into a similar success in a real situation. As good as they are, flight simulators cannot possibly account for all conditions and variables, particularly the stress involved. —Ed.

The aging aviator

To write about "aging aviators" is like writing about "aging rock stars"—just plain silly and intellectually lazy because we are all aging, and at the same rate: one day per day, one year per year.

Gradually, the accumulated insults to the body start making themselves apparent. Vision problems, poor hearing, and unreliable memory become undeniable parts of daily life. All these issues have flight safety implications. Transport Canada (TC) medical exams check that our vision and hearing remain satisfactory for pilot-in-command (PIC) duties, but I remember nothing in 46 years of TC medicals that would evaluate memory or thinking abilities—and these concerns are starting to loom large for many of us.

The population bulge now entering its sixties includes many pilots. Popular magazine articles and even books about memory loss are cascading on our helpless, graying heads. We can't go for coffee with friends without being regaled with stories about their forgetfulness: "I went to the basement for two Robertson screwdrivers and after some distractions and interruptions came up with my Bach and Beethoven eight-tracks!"

Not trusting your aircraft is a safety hazard. It distracts you from important flight-related thinking, such as situational awareness, fuel management or slow weather changes. It can also lead to poor decisions because your judgment is already spring-loaded to expect mechanical failure. You jump every time your ears clear, or you notice a vibration for the first time, or smell something new.

But what if you don't trust yourself? "I don't remember locking the house," is not much different from "I don't remember putting that darned gas cap back on," except that the latter can distract you from important aviatorial thinking. You worry about whether you are safe to fly with the memory deficits that are beginning to surface. But an individual pilot doesn't know if he or she is any different from anybody else at this stage of life. Maybe those grey-haired trans-Atlantic 777 captains are also misplacing their sunglasses on top of their heads. Are you crying before you're hurt?

It would be helpful not to have this worry on your mind. Perhaps there could be access to a standard test of memory and cognition, an objective measure of whether or not you are mentally safe to fly. Do well on it, and there's one less distraction for you and one less worry for your spouse.

Rob McMillan
Winnipeg, Man.

Buttonville Flying Club does indeed think safety

I am writing this letter in response to the excellent article titled "Does Your Group Think Safety?" by Gerry Binnema, which was published in *Aviation Safety Letter* (ASL) 4/2007.

I am the President of the Buttonville Flying Club, a.k.a. Canadian Owners and Pilots Association (COPA) Flight 44, which we understand may be the largest COPA flight. We have approximately 180 members; about 70 of them either own or share in the ownership of an aircraft, and quite a few other members purchase block time as a reasonable approach to staying active and current with flying. As well, many of our members are IFR-rated, which we find is a practical, safer and more effective solution to moving around Toronto airspace.

We pride ourselves on a very active aviation safety program that leads to a highly developed awareness of and positive attitude toward safety among our members. Much of this activity is headed up by one of our members who voluntarily takes on the challenge of Flight Safety Officer. Our monthly meetings frequently cover such topics as "raising the bar" in both VFR and IFR safety, flying safely and effectively in the very busy Toronto airspace, proper IFR operations, effective engine management, area navigation (RNAV) procedures, weather flying, search and rescue (SAR), proper emergency locator transmitter (ELT) management, Civil Air Search and Rescue Association (CASARA) operations, and cross-border operations.

In addition to our regular monthly meetings, up to 20 of us gather every Saturday, Sunday and holiday mornings in the terminal at our home base at Toronto's busy Buttonville airport, when, before we launch into the day's flying, there is usually a discussion on some aviation safety topic.

I trust this input provides a useful response to Gerry Binnema's thoughtful piece.

Paul Hayes
President and Flight Captain
Buttonville Flying Club
Markham, Ont.

Vapour-proof safety flashlight

I would like to draw attention to the article titled "Detection of Water in Fuel Drums," published on page 4 of *Aviation Safety Letter* (ASL) 3/2008. The use of a flashlight to spot water in a fuel drum could be very dangerous unless a vapour-proof safety flashlight is used. Unapproved flashlights can ignite fuel vapour via the switching mechanism. The conclusion outlined by the author of the article is correct: use water-finding paste on a dipstick—a perfectly safe and reliable way to detect the presence of water in the barrel.

As an added precaution, to prevent precipitation from seeping into a drum through the plugs or caps during storage, the drum should be propped up about 6 in., arranged with the bungs located at each side. This method allows water to drain away from the bungs, preventing seepage into the barrel.

During refuelling operation from a barrel, it is also good practice to tilt the barrel, keeping the pump at the highest point when pumping out fuel. A cement or wooden block can be installed under the barrel as a method of keeping the pickup point for the pump as far as possible from any water that may have accumulated in the bottom of the barrel. Water will always accumulate at the low point; thus the reason for keeping the fuel pickup point a little on the high side.

Joe Scoles
Ottawa, Ont.

Flying Over Cold Water? Time for *Cold Water Boot Camp!*

A new awareness campaign for recreational boaters on the deadly effects of cold water will surely benefit anyone flying over water. Read more about this campaign at www.tc.gc.ca/mediaroom/releases/nat/2008/08-h221e.htm, and about the *Cold Water Boot Camp* at www.coldwaterbootcamp.com/.

PRE-FLIGHT

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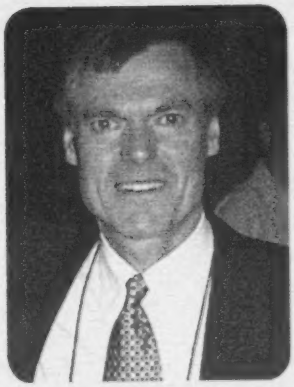


Bruce MacKinnon at the Canadian Aviation Safety Seminar (CASS) 2000 in St. John's, N.L.

A consummate professional, Transport Canada's wildlife control specialist Bruce MacKinnon was also a dedicated family man, a passionate advocate of aviation safety, and one of the most amicable people in the department. His wildlife control expertise was recognized around the world and he would jump on any opportunity to share it with others. Always in high demand for his time and knowledge, Bruce managed to contribute generously to the Aviation Safety Letter *(ASL) over the years, and this last instalment is just one more example. Bruce MacKinnon passed away on July 6, 2008, in an aviation accident in northern Ontario. Bird Strike Committee Canada has established the Bruce MacKinnon Memorial Scholarship, which aims to remember Bruce and to continue to bring education and awareness in the field that he loved. A beautiful tribute to Bruce's life and accomplishments has also been posted on their Web site, at* www.birdstrikecanada.com/BruceMacKinnonScholarship.html.

Thank you Bruce, from all of us here at the ASL.

Animal Ambush: The Challenge of Managing Wildlife Hazards at General Aviation Airports

Adapted by Bruce MacKinnon, Wildlife Control Specialist, Civil Aviation, Transport Canada

The following article is an edited version of "Animal Ambush: The Challenge of Managing Wildlife Hazards at General Aviation Airports," which explores in detail wildlife hazards at general aviation (GA) airports in the United States. The article was written by Dr. Richard A. Dolbeer, Michael J. Begier and Sandra E. Wright from the U.S. Department of Agriculture. The guidelines are also applicable to GA airports in Canada.

—Bruce MacKinnon, June 2008.

Introduction

Increasing wildlife populations and their adaptation to the airport environment have become a safety and economic concern for the aviation industry. The limited management of wildlife hazards at many GA airports adds impetus for actions by pilots and aircraft owners to assist in reducing damaging wildlife strikes. Listed below are recommendations to mitigate the risk of damaging strikes.

Question 1: At what height (above ground level [AGL]) do most strikes occur?

Answer: Bird strikes have been reported up to 32 000 ft. The majority of damaging strikes occur below 100 ft and frequently between 501 and 3 500 ft. Pilots should climb expeditiously in areas and seasons of high bird activity and avoid high-speed flight below 3 500 ft. Speed contributes more to the amount of damage than bird mass does.

Question 2: Do more strikes occur during takeoff or landing?

Answer: More bird and deer strikes are reported during the landing phase of flight compared to takeoff and climb. In contrast, turbine-powered engines are more likely to sustain substantial damage with possible hull loss during takeoff and climb. Pilots should delay takeoff if birds are observed on the runway.

Question 3: Shouldn't birds sitting or standing on the runway notice an approaching aircraft and disperse?

Answer: Pilots should not assume that birds will detect or react in time to avoid a strike with their aircraft. The majority of birds will attempt to avoid approaching aircraft, but avoidance reaction may be too late or inappropriate. Furthermore, birds are apparently less able to detect modern aircraft with quieter engines compared to aircraft with noisier engines.

Question 4: What about flying or soaring birds? Do birds normally dive or climb in response to an approaching aircraft?

Answer: The majority of birds encountered above 500 ft AGL try to dive, and few birds attempt to climb. In contrast, below 500 ft AGL only 25 percent of the birds encountered in the air showed an attempt to dive and 32 percent attempted to climb. If an avoidance manoeuvre is possible, a pilot should try to fly above birds, although expect unpredictable manoeuvres close to the ground.

Question 5: Are bird strikes only a problem during the day? What about deer strikes?

Answer: More total bird strikes to civil aircraft occur during daylight, but the probability of a bird strike is greater at night, especially above 500 ft AGL. Pilots should fly above 3 500 ft AGL at night during spring and fall migration periods to minimize the possibility of en-route bird strikes. For deer, about 80 percent of the strikes occur at dusk or night.

Question 6: What about season of year?

Answer: In North America, July to November is the worst period for damaging bird strikes in the airport environment (below 500 ft AGL) and the highest bird population levels occur in late summer. Above 500 ft, September to November, April and May are the most dangerous months—the peak periods of migration. October and November are the worst months for deer strikes.

Question 7: Are strikes more likely under certain weather conditions?

Answer: Strikes occur more frequently on rainy days. This increase might relate to the greater abundance of invertebrate food at the soil surface, which is appetizing for birds.

Question 8: Are bird strikes more likely to occur to wing-mounted turbofan engines or fuselage-mounted turbofan engines?

Answer: Wing-mounted engines were five times more likely to have a bird strike compared to fuselage-mounted engines, based on an analysis of engine strikes per 100 000 movements for commercial air carriers in the U.S. from 1990 to 1999.

Question 9: Will the deployment of on-board radar disperse birds from the path of an approaching aircraft?

Answer: Many species of birds are sensitive to certain stimuli such as earth's magnetic field for navigation. However, there is no scientific evidence that birds detect radar deployed on aircraft or even that detection would be sensed as a threat and cause birds to avoid aircraft.

Question 9 a): Are visual devices effective for alerting birds of approaching aircraft?

Answer: Birds often respond to light beams with abrupt avoidance manoeuvres, although only limited data suggest that pulsating landing lights reduce bird strikes. Additional research is needed to determine optimal strategies. However, pilots should not rely on radar, aircraft and spinner markings or lights to prevent bird strikes.

Question 9 b): Will ultrasonic devices keep birds out of hangars and off the airfield?

Answer: Ultrasonic devices are not effective against birds in hangars or on the airfield, and birds do not hear in the ultrasonic range any better than humans do.

Question 10: Why should a pilot report strikes?

Answer: Strike documentation is an important means of educating the public about the need for wildlife management at airports. It also alerts airport operators, regulatory agencies and others to the need for improved management strategies.

Question 11: How does someone report a strike and ensure proper identification of bird species?

Answer: In Canada, wildlife and bird strike reports can be completed and submitted several ways:

Electronically:
www.tc.gc.ca/aviation/applications/birds/en/default.asp
By phone (toll-free hotline): **1-888-282-BIRD (282-2473)**
On paper: order hard-copy bird/wildlife strike report forms (form number 51-0272) in bulk from the Transport Canada with the following contact information:

Web site: www.tc.gc.ca/Transact
Toll-free (North America only): **1-888-830-4911**
Local: **613-991-4071** Fax: **613-991-2081**
E-mail: MPS@tc.gc.ca

If a species is unidentifiable by flight crew or airport personnel, consult a local biologist. A digital photograph of the remains is helpful. If a local biologist is not available, feathers or tissue from the bird species can be sent to the Smithsonian Institution (see addresses below) for correct species identification free of charge.

U.S. Postal Service:
Feather Identification Lab
Smithsonian Institution
PO Box 37012
NHB, E610, MRC 116
Washington DC 20013-7012
or
Courier:
Feather Identification Lab
Smithsonian Institution
NHB, E610, MRC 116
10th & Constitution Ave. NW
Washington DC 20560-0116

More details can be found at http://wildlife-mitigation.tc.faa.gov and in the Federal Aviation Administration (FAA) Advisory Circular 150/5200-32A.

Conclusion

By addressing the important safety and economic issues related to wildlife at GA airports, pilots can assist in the justification and development of wildlife hazard mitigation programs, and help to improve education programs for pilots and aircraft owners. All stakeholders in this important safety issue must contribute in order to minimize the risk associated with collisions between wildlife and aircraft at GA airports. △

The SAC Column:
What Glider Pilots Should Know to Avoid Unnecessary SAR Response After a Landout

by Dan Cook, Soaring Association of Canada (SAC)

The e-mail and response below will be of interest to all pilots, NAV CANADA and anyone involved in search and rescue (SAR) activities. The e-mail was from a glider pilot, and was addressed to the SAC's Flight Training and Safety Committee (FTSC). The response may help to understand how glider operations may affect us.

E-mail:

"A recent routine landout by a pilot, who was being monitored by a NAV CANADA terminal controller, resulted in the dispatch of a search helicopter from a rescue centre, when radio contact was lost. It seems that controllers do not realize that a landout (in a highly cultivated area) is routine and almost risk free.

If this becomes a regular response, then a great deal of resources will be wasted, and it could be an excuse to charge the SAC for services. Moreover, Transport Canada (TC) could demand filing of flight plans and all that rigamarole.

There seems to be a suggestion that pilots should call rescue coordination after a "landout." Does the SAC have a position on this? Has it been discussed with NAV CANADA?"

FTSC response:

All pilots (including glider pilots) are required to file a flight plan, or flight itinerary, (with a responsible person) in accordance with *Canadian Aviation Regulation* (CAR) 602.73 when planning to fly cross-country. As most glider cross-country flights are done within gliding clubs, the regulation is routinely met for a flight itinerary when a glider pilot declares their turn points to the field manager (responsible person), who will notify SAR should the pilot not return and is not heard from by the end of the soaring day. This information should be recorded in the club's operation log at the flight line, prior to departure, due to changes in personnel during the flying day. All glider pilots have been trained to notify the club—after a landout—that they are safely down, so that they can have the retrieve crew dispatched and prevent an unwanted search. Landing out is a normal and routine part of glider cross-country sport flying. We do not want to land out, but we must be prepared and plan for it because lift is not guaranteed.

As airspace is getting more complicated, many pilots are now contacting NAV CANADA air traffic control (ATC) facilities during their flights. If contact has been established, it is customary for the pilot to let ATC know when they are leaving the frequency or airspace. Should a landout occur after contact has been made, and before the pilot has notified ATC of leaving the frequency or airspace, then it would be prudent for the pilot to also notify NAV CANADA—through any ATC facility—that they have landed safely, to prevent an unwanted search. If the pilot is unable to call ATC, they can relay a message on 121.5 MHz to over-flying commercial traffic that routinely monitor the frequency.

In addition, more gliders are using an emergency locator transmitter (ELT) and the pilot should monitor 121.5 MHz after landing to ensure that their transmitter has not been activated. Regional rescue centres start a telephone search upon ELT activation, but often will commit resources when NAV CANADA reports that a radar contact has been lost and communications cannot be re-established. Failure to follow any of the above explanations could result in the pilot being financially responsible for the rescue costs. For more information, see sections RAC 3.0 (www.tc.gc.ca/CivilAviation/publications/tp14371/RAC/3-0.htm) and SAR of the Transport Canada *Aeronautical Information Manual* (TC AIM).

A gliding instructor further commented on the above FTSC response:

The New Brunswick Soaring Association (NBSA) had a problem like this years ago when I flew there. The problem was that the glider pilot was communicating with ATC, ran out of lift and informed ATC that they were landing in a field. The standard protocol is for ATC to notify SAR after 30 min if contact has been lost. This sounds like a similar scenario.

SAR then did a communications search. After ATC notified SAR of the lost contact and the Halifax Joint Rescue Coordination Centre (JRCC) tracked the NBSA down and contacted us in Havelock, N.B., we explained that the glider had landed safely and contacted us, so there was no emergency and it would be retrieved in due course. We were busy with students, so "due course" was much later.

It did not help that the glider landed in a large field under a busy visual flight rules (VFR) airway about 10 mi. from Moncton, N.B., or that the pilot removed the canopy, turtle-deck, cushions, etc. to expedite the eventual de-rigging. Until we finally got around to retrieving the glider, sightings of the wreckage and apparent debris were reported by passing pilots for the rest of the afternoon. The military SAR staff on duty spent the afternoon

fielding the "crash" reports and making annoyed calls to our operations in Havelock.

While it is important for flight plans or itineraries to be filed with responsible persons, it may not always prevent incidents like this. Once a glider contacts a flight service station (FSS) or ATC, the "30 min lost contact protocol" is activated. Consequently, unless the radio contact is formally closed, such as "glider *ABC* switching to 123.4, *ABC* out" **and/or** a call is made to ATC after landing to confirm "flight plan closed," SAR response will follow (as it should.)

In the NBSA incident, the pilot flew only gliders and was not used to dealing with ATC; working with a glider is not that common for ATC either.

Conclusion: if you talk to an FSS or to ATC, formally end the conversation before landing, and for good measure, phone them once you are on the ground to confirm that all is well. △

COPA Corner: The New Aircraft Avionics

by John Quarterman, Manager, Member Assistance and Programs, Canadian Owners and Pilots Association (COPA)

This spring, COPA staff participated in familiarization and conversion training on one of the relatively new, four-place, single-engine, *glass cockpit* aircraft, which COPA now uses to attend COPA events, fly-ins, and aviation meetings across our region. Normally, pilots are required to take a manufacturer's training course when these aircraft with their modern and sophisticated avionics are bought new from the factory. In order for a pilot to fly a used aircraft, many insurers insist on the same factory course or an aftermarket equivalent. These new aircraft are very pleasant to fly, with capable autopilots, instant situational awareness, and hundreds of different helpful displays and features available at the push of a few buttons.

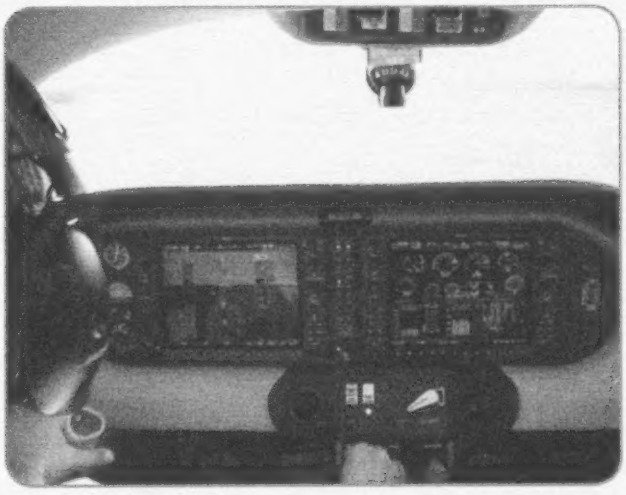


Photo: K. Psutka

Modern glass cockpit in a general aviation aircraft

For pilots used to the rather sparse instrumentation of the seventies-era flying-school aircraft equipped with two navcoms—if working—a somewhat unreliable automatic direction finder (ADF), perhaps distance measuring equipment (DME), hardly ever an autopilot, these new aircraft are like a dream come true.

What has become apparent to all our COPA pilots is that the new aircraft instrumentation requires a discipline that we didn't previously need to the same degree. There is so much to look at, so much to "play with," there are so many functions to use that we have found it very tempting to fly "heads down," watching and using all the new instrument features available. The discipline to maintain a careful scan of the airspace around us while flying in visual meteorological conditions (VMC) is an important part of learning to fly these new aircraft.

An essential safety factor in flying these aircraft is currency. It is our experience—and this is echoed by many COPA members who own these aircraft—that the sophistication of the new avionics requires constant practice in order for pilots to stay proficient in finding and using the features in these units quickly and while keeping up with cockpit workload. This same issue was found to be a challenge with the new GPS units that emerged around the turn of the decade and that were retrofitted into our round-dial aircraft. The challenge is now even greater, as the number of features, consequent screens, soft keys, and buttons have multiplied with the new factory-equipped, glass-panel aircraft. Using all these features effectively means using them must be second nature to the pilot operating in high-stress, busy environments.

Recently, a spate of informal media surveys indicated that pilots are cutting back on training and flying hours due to increased costs—especially fuel costs. While these surveys do not represent scientific data, and while there are no recently published Transport Canada statistics, it is clear from anecdotal evidence that pilots are feeling the pressures of increased costs. Certainly, flying less to lower costs does not fit well with the necessity for pilots to stay proficient in the technology and operations of their new aircraft.

Several options can help minimize the effects of decreased flying hours. For example, computer simulation programs are available from all the major avionics manufacturers, allowing the pilot to practice nearly all actions, features, flight-planning and instrument-approach capabilities of the avionics fit while on the ground. Supplementing this avionics familiarization and practice with regular simulator sessions to keep current with instrument procedures is another option that helps maintain the pilot's currency. Finally, regular review of the new, more complex systems, planning requirements, engine management features, and of all the other familiar flying rules, procedures, weather knowledge, and other facets of safe aviating can help to make our transition to flying in the twenty-first century safe. For more information on COPA, visit www.copanational.org. △

TSB Communications on Visual Glide Slope Indicator (VGSI) Issues

The following are two Aviation Safety Advisories *recently submitted to Transport Canada (TC) by the Transportation Safety Board of Canada (TSB)*

Background

On November 11, 2007, a Bombardier Global 5000 departed Hamilton, Ont. (CYHM), for Fox Harbour, N.S. (CFH4), with two crew members and eight passengers onboard. On approach to Runway 33, the crew followed the visual glide slope indications from an abbreviated precision approach path indicator (APAPI) to guide their descent. At 14:34 Atlantic Daylight Time (ADT), the aircraft touched down seven feet short of Runway 33 at Fox Harbour. The landing gear was damaged when it came in contact with the edge of the runway, and directional control was lost when the right main landing gear collapsed. The aircraft departed the right side of the runway and came to a stop 1 000 ft from the initial touchdown point. All occupants evacuated the aircraft. One crew member and one passenger suffered serious injuries, while the others suffered only minor injuries. The aircraft suffered major structural damage. The TSB investigation into this occurrence (A07A0134) is ongoing.

The Fox Harbour Runway 33 VGSI is an APAPI system and is designed for use by aircraft with eye-to-wheel height (EWH) of up to, but not including, 10 ft (3 m). The crew had flown into the Fox Harbour aerodrome on at least 80 occasions and were familiar with the runway environment. They had relied on the Runway 33 APAPI guidance in the past to complete approaches, normally touching down within the first 500 ft of runway. However, previous flights were with smaller aircraft, such as the Challenger CL604 with an EWH of 12.1 ft (3.7 m). The crew had little overall experience on the larger Global 5000 with an EWH of 17.2 ft (5.2 m) and it was only their third time landing this aircraft at Fox Harbour.

Flight crew awareness of VGSI system limitations

VGSI information can be found in many different publications used by operating flight crews, such as the Transport Canada *Aeronautical Information Manual* (TC AIM), as well as in the *Canada Air Pilot* General Pages (CAP GEN) and the *Canada Flight Supplement* (CFS), both published by NAV CANADA. For example, the CAP GEN describes the different types of precision approach path indicator (PAPI) systems available. A table provided in the Approach Lights Legend section gives the following information:

- P_1 PAPI for aircraft with eye-to-wheel height up to 10 ft.
- P_2 PAPI for aircraft with eye-to-wheel height up to 25 ft.
- P_3 PAPI for aircraft with eye-to-wheel height up to 45 ft.
- A_P Abbreviated PAPI for aircraft with eye-to-wheel height up to 10 ft.

Following visual guidance from a visual approach slope indicator system not appropriate for the type of aircraft operated can result in an unsafe threshold crossing height. This is especially critical when operating to a runway not served by an electronic glide path, when visual illusions might be present, or at night. Flight crew knowledge of the limitations associated with the different types of visual approach slope indicator systems in use is therefore essential in order to assess the appropriateness of the system to the type of aircraft operated.

Many small community aerodromes across Canada are serviced by aircraft with EWH exceeding the limitations of the aerodrome's visual approach slope indicator systems. Furthermore, compared to older aircraft, newer aircraft, such as the Global 5000, now have landing and take-off performance capabilities allowing them to operate using short runways. Those short runways are often equipped with visual approach slope indicator systems appropriate for aircraft with EWH of less than 10 ft. This situation increases the exposure to the risk of landing with reduced threshold crossing height safety margin.

Even though information related to VGSI systems is available in multiple publications, the investigation has determined that while pilots are aware that different systems are in use, they are not aware of their associated limitations, nor are they aware of the significance of following guidance from a system that is not appropriate

to the aircraft type operated. For example, it is not critical for a small aircraft to follow visual guidance from a P_2 or P_3, as it would only provide a greater threshold crossing height; however, any aircraft with an EWH greater than 10 ft following visual guidance from a P_1 or an A_p would not be assured a safe threshold crossing height.

The TC *Flight Instructor Guide—Aeroplane* (TP 975E) lists the topic of VGSI as a teaching point under the night flying section. Although instructors cover the different types of equipment and their associated limitations, the emphasis is put on the significance of VGSI system indications to the pilots, without discussing the risks associated with following VGSI guidance not appropriate for an aircraft type. This limited emphasis results in pilots relying on VGSI guidance not suitable for some of the aircraft types they are operating. The investigation has determined that a RED/WHITE on-slope indication on approach would be perceived by pilots as a confirmation that they were on a safe flight path to landing. Without considerations for the type of VGSI system generating the visual guidance, following an on-slope indication could result in a large aircraft not having a safe threshold crossing height.

Furthermore, the only related topic addressed in TC flight crew examinations is the interpretation of the different visual indications provided by VGSI equipment. There are no questions with regards to the limitations of the different types of VGSI currently in use (PAPIs).

Due to flight crew limited knowledge of the different VGSI systems in operation and the significance of their limitations on the safety of flight operations, flight crews will continue to follow visual guidance that may not be appropriate for the aircraft type they are operating. Those flight crews will therefore not be assured safe threshold crossing height.

Therefore, TC may wish to review the pilot training requirements so that flight crews are made aware of VGSI limitations as well as its impact on the safety of flight operations for their aircraft type.

Availability of aircraft EWH information

VGSI system guidance is important when approaching a runway not served by an electronic glide path, when visual illusions might be present, or at night. However, knowledge of an aircraft's EWH is necessary in order to assess whether a VGSI system is appropriate for the aircraft type being flown.

At the time of the above-mentioned occurrence, the crew was not aware of the EWH of either the Challenger CL604 or the Global 5000. The Global 5000 EWH was not published in the aircraft flight manual (AFM), or otherwise available to the crew. Although information relevant to the operation of an aircraft is usually published in the AFM, the investigation has determined that EWH information is generally not available in the AFM.

In the past, large aircraft performance characteristics precluded operations from short runways such as Fox Harbour's 4 885-ft Runway 33. Modern large aircraft with better short field performance are now able to operate from shorter runways, where they are more likely to encounter VGSI designed for smaller aircraft. A large aircraft with an EWH greater than 10 ft following visual guidance from a VGSI designed for a smaller aircraft is not assured a safe threshold crossing height. Without EWH information, this situation increases exposure to the risk of landing with a reduced threshold crossing height safety margin.

On November 26, 2007, the TSB issued an Aviation Safety Information Letter to TC, informing them that the approach was flown with reference from an APAPI that was not designed for a Global 5000 with an EWH that, at the time, was suspected to be greater than 10 ft. TC's response stated that EWH information is not normally stated in the AFM, nor is there a requirement to do so. TC also pointed out that, should an operator require this information, the type certificate holder can provide it to the operator on request. The investigation has determined that even the type certificate holder may not have this information readily available.

Because aircraft EWH is not available to pilots, crews may continue to conduct approaches with an aircraft mismatched to the VGSI system, increasing the risk of an unacceptable threshold crossing height safety margin.

Therefore, TC may wish to review the requirements to have aircraft EWH information available for use by flight crews in aircraft publications. △

THINK WINTER FLYING!

Air Taxi Safety

by Gerry Binnema, Civil Aviation Safety Inspector, System Safety, Pacific Region, Civil Aviation, Transport Canada

The air taxi industry is facing a number of significant challenges in today's market conditions. The price of fuel is skyrocketing. Qualified staff are often hard to find and retain. Clients are becoming more safety conscious, but do not seem to be willing to pay a premium for better equipment and more experienced staff. How can you, as an operator, cope with these demands and continue to provide a safe and efficient operation?

A couple of years ago, there were several high-profile accidents in the Pacific Region involving air taxi operators. As a result, Transport Canada conducted a safety study on the air taxi sector, primarily focusing on the situation in the Pacific Region. This study has now been published and you can find it at: www.tc.gc.ca/civilaviation/regserv/SafetyIntelligence/AirTaxiStudy/menu.htm. The report identifies a wide range of hazards, but many of them are simply beyond anyone's control. For instance, there is very little that can be done about the mountainous terrain and poor weather that is typical of much of coastal British Columbia.

A recent Pacific Region Aviation Safety Council meeting focused on this report and sought operator input on what hazards were significant for them, and how they were coping with those hazards. The top hazards from the operator's perspective involved staffing challenges, managing employee fatigue, and dealing with client pressures. Some ideas from this session are presented below.

Staffing challenges

It has probably never been more difficult to find qualified staff. In particular, aircraft maintenance engineers (AME) and helicopter pilots are in short supply. Even on the fixed-wing side, air taxi operators are finding it difficult to find experienced staff, and as a result, they are hiring lower-time pilots and doing more training with them. In order to deal with this hazard, operators have adopted several strategies; you may wish to consider some of these ideas.

- The pay versus experience balance is one that could be revisited. By increasing salaries to attract and retain more qualified people, you can reduce training costs and possibly insurance premiums. You might also reduce the risk of expensive accidents or incidents.
- More experienced staff may be a selling feature for your company. Letting your clients know that all your staff have more than a certain number of hours may attract more business.
- If your company has a wide range of aircraft, you can create a training structure that hires low-time pilots and puts them into action on your smaller aircraft, and then train them to your standards and bring them into more complex aircraft and operations.
- You could develop briefing packages for your various destinations and routes. Prior to the first trip into any location, the pilot could review the material, and review the route using an on-line satellite imagery program. This would give the pilot the benefit of many people's prior experience.
- The company culture must create a healthy learning environment, where new pilots are encouraged to ask questions, are often asked if they feel comfortable, and someone is often available to review their planning. It only takes one person in the company with a surly attitude toward a new pilot to make learning a more difficult experience.

Remember that the number of flying hours is only one measure of experience. You may hire a pilot with many hours of float experience, but that may not be helpful if it is not coastal experience. Likewise, a low-time pilot who has good relevant experience and is sharp may be a better fit than someone with more hours.

Managing fatigue

Many air taxi operators use a self-dispatch style of operational control. This means that the pilots are told where they are flying, and the planning of the flight is left to them. This gives pilots a great deal of autonomy and control over the details of their flight, which might not be the best thing for pilots with little experience. The challenge for the operator is how to maintain operational control under a self-dispatch system.

One challenging issue is that of fatigue. The regulations allow a pilot to be on duty for 14 hours a day, but 14 hours of loading and unloading aircraft, flight planning, flying, and aircraft servicing could well lead to fatigue, particularly if the pilot is still getting used to the job. If the operator is not there to observe the pilot, how can they ensure that the pilot isn't operating while very fatigued?

Some operators manage fatigue by setting up guidelines that are more conservative than the regulations. They look

at the kind of operation, and the level of experience, and establish appropriate flight and duty time restrictions.

Fatigue is not just limited to pilots. Some operators try to educate their staff, including AMEs and pilots, on the signs and symptoms of fatigue, so that all their staff know when to call it a day. This kind of approach can only be effective when the operator sets a tone that allows people to stop when overly fatigued. Transport Canada has developed some fatigue management guidance. You can find it on our Web site at:
www.tc.gc.ca/civilaviation/SMS/FRMS/menu.htm.

Pressure

The self-dispatch system also puts pilots in direct contact with the client. The client may exert a great deal of pressure on the pilot to carry out the flight, even against the pilot's better judgement. This pressure can be deflected more readily when pilots are confident that management will back up their decision. Again, this issue is best managed when operators maintain open lines of communication and support the pilots in their decisions.

A critical moment occurs each time a pilot refuses a flight and the client complains to the manager. The manager then approaches the pilot to find out what happened. It is easy for the pilot to feel that his judgement is being questioned, so the manager must begin by expressing support for the pilot. The manager can indicate that he needs to know what happened, only so that he can properly respond to the client. The manager should also end the conversation by again expressing support for the pilot.

Another critical moment occurs when a pilot makes a poor decision due to lack of experience, fatigue, or excessive pressure. In order to maintain a positive safety culture, it is important to handle the situation appropriately. Reprimanding the pilot might feel good, but does it help? Or does the reprimand create a fear of asking questions or confessing an error in the future? The pilot thought he was doing the right thing at the time, so it is important to understand how his decision-making went wrong, and provide strategies to prevent a re-occurrence. This requires that you get the full story from the pilot and then work with the pilot to ensure that a similar event will not re-occur, either to him or to anyone else in the company.

None of the above thoughts are especially new, but they are incredibly important in today's challenging market conditions. Staff turnover can create instability in a company, which leads to a domino effect. Maintaining operational control requires more work, as new staff need closer supervision and guidance. New staff are also more susceptible to client pressure. Providing clear guidance and maintaining open communication becomes critical in these environments. △

TC AIM Fast Fact: Airframe Icing

Report icing to ATS and, if operating IFR, request a new routing or altitude if icing will be a hazard. Give your aircraft identification, type, location, time (UTC), intensity of icing, type, altitude or flight level, and indicated airspeed. (See the suggested format on the back cover of the *Canada Flight Supplement* [CFS].)

The following describes icing and how to report icing conditions:

INTENSITY	ICE ACCUMULATION
Trace	Ice becomes perceptible. The rate of accumulation is slightly greater than the rate of sublimation. It is not hazardous, even though de-icing or anti-icing equipment is not used, unless encountered for an extended period of time (over 1 hour).
Light	The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour).
Moderate	The rate of accumulation is such that even short encounters become potentially hazardous, and use of de-icing or anti-icing equipment or diversion is necessary.
Severe	The rate of accumulation is such that de-icing or anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.
* Rime ice	Rough, milky, opaque ice formed by the instantaneous freezing of small supercooled water droplets.
* Clear ice	Glossy, clear, or translucent ice formed by the relatively slow freezing of large supercooled water droplets.

** Type of icing*

Source: Transport Canada Aeronautical Information Manual *(TC AIM) MET 2.4*
www.tc.gc.ca/CivilAviation/publications/tp14371/MET/2-0.htm#2-4

Super/Hypersonic Travel and Safety Management Systems: What's the Link?

by Bill Harrod, Civil Aviation Safety Inspector, Airlines Division, National Operations, Civil Aviation, Transport Canada

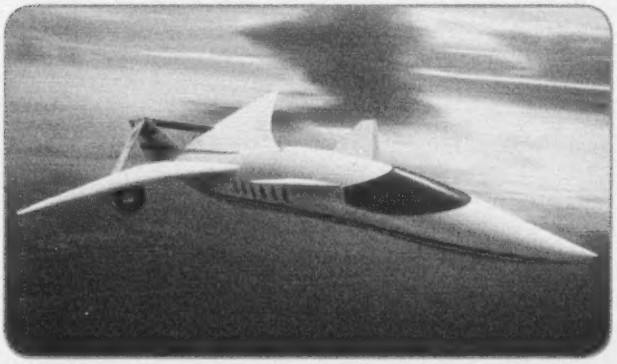


Illustration: Nick Kaloterakis, VFX Direction

QSST–Quiet Supersonic Transport
[Lockheed Martin's Skunk Works]
12-passenger business jet
47 000–57 000 ft altitude
Mach 1.7 (1100 mph)–New York to Los Angeles: 2 hr
Sonic wake = 1/100th of Concorde

Illustration: Nick Kaloterakis, VFX Direction

A2 (Green Skies at Mach 5)
[Reaction Engines' A2 Concept]
300 passengers
Mach 5 (3 400 mph)–Brussels to Sydney: 4 hr
Ultra-low carbon footprint

In one form or another, safety management systems (SMS) and travel at speeds greater than Mach 1 will unquestionably be a part of the future of change in aviation. Business travellers constantly seek more efficient travel, such as very light jets (VLJ) for point-to-point travel, and the public is slowly embracing environmentally friendly travel through the purchase of environmental offsets.

Industry and regulators alike are striving to improve upon low accident rates in the context of a future with potentially dramatically increased air travel. Additionally, industry is seeking to curb the ever-increasing costs, primary and secondary, associated with safety-related events, such as aircraft ground damage. **Enter SMS:** a "globalized" holistic approach to corporate safety now being implemented in countries around the world.

Fundamentally, SMS seeks to strengthen a system that is based on a *reactionary* mode of dealing with safety-related events by enhancing personal and organizational behaviour to *proactively* identify, assess and prevent potentially resource-costly events: prevent vs. repair. Thus, first and foremost, the transition to SMS is a culture change both for the companies that are implementing these systems and for the Transport Canada Civil Aviation (TCCA) inspectors who oversee them.

Recognizing the significance of these cultural changes, the level of effort required to implement them, and, indeed, its own capacity to provide the necessary oversight through the transition, TCCA opted for a phased implementation approach. This phasing was carried out in terms of segments of the industry and in terms of implementation within a specific company. Initial implementation of the *Canadian Aviation Regulations* (CARs) for SMS included air carriers operating under CAR 705.

Six carriers operating under CAR 705, Air Transat, Sunwing, Air Canada, Skyservice, WestJet and Air Canada Jazz are overseen by TCCA's National Operations Branch and are well along in the transition to full implementation of SMS. Each has completed the four-phased SMS implementation and will have undergone their first full SMS assessment by the end of 2009. To be sure, there have been implementation issues to resolve: (1) the change from a *prescriptive* regulatory oversight approach to a performance-based approach; (2) the work required by industry to implement the new systems and by Transport Canada to oversee the implementation; and (3) the work required to sort through the details of the new processes. But along the way, both TCCA and the companies above have learned valuable lessons—lessons that are worth sharing.

Each carrier that is overseen by the National Operations Branch has prepared a short article reflecting the use of SMS in their company.

AIR TRANSAT

AIR TRANSAT: Aircraft Type A310

The event involved three separate but different smoke warnings, while on the ground, at approximately 10 min intervals. All indications turned out to be false and disappeared before departure. During the climb, at 2 000 ft above ground level (AGL), one of these warnings—aft cargo—reappeared even though the aft cargo hold was empty. The appropriate actions were carried out and the warning disappeared.

The SMS investigation revealed that the smoke detection was subject to false warnings due to high humidity. Industry research on replacement of smoke detectors provided a retrofit option on the optical smoke detector; the Technical Operations Department presented the option for replacement of the detectors for this fleet. Based on "an increased safety factor"—a much higher reliability of an "actual warning"—the decision was made to replace the detectors. The cost: approximately $300,000. The benefits: safer travel for the public and, secondarily, the potential to save money resulting from fewer delays on the ground, fewer in-flight turn backs/diversions, and less damaged equipment.

AIR TRANSAT: Aircraft Type A310

This event involved a traffic alert and collision avoidance system (TCAS) alert and occurred in reduced visibility in haze at 7 300 ft. The intruding aircraft was at the same altitude and at 1.5 NM to the left. There was no resolution advisory (RA), the distance between aircraft remained constant, and the crew continued in the descent. When air traffic control (ATC) was queried, they informed the crew that they did not advise them of this potential conflict, since the traffic was VFR and remaining north of the centreline.

The SMS investigation underlined the following: the aircraft involved, like six others, was equipped with a TCAS indicator of only 6 NM range and the other five aircraft in the fleet had TCAS indicators of 40 NM range. The Safety Department investigation revealed a disparity between aircraft and that this TCAS event would have been less traumatic and easier to manage if the longer TCAS range capability were available. The Technical Operations Department's business case for fleet rationalization to the 40 NM range capability was accepted. The costs for retrofit of seven aircraft: $100,000. The benefits: safer flight for the public and increased probability of avoiding costs related to injuries caused by abrupt aircraft manoeuvring due to late awareness of TCAS events.

SUNWING

At Sunwing, we have found tremendous benefit from the implementation of SMS. Improvements in safety, efficiency and efficacy have been, and continue to be, realized in all areas of our operation thanks to the processes introduced by Transport Canada's SMS implementation.

On a particularly cold night, one of our Boeing 737-800s was secured and parked on the apron for an early morning departure. Although the aircraft was serviced in accordance with the manufacturer's instructions, a water line leading to the aft galley froze overnight causing damage to a coupling in the line. During the flight, warm cabin air thawed the line and water began to drip onto the outflow valve causing problems with the aircraft's pressurization system. The flight crew dealt with the problem and the aircraft landed safely.

A safety investigation revealed a design issue with the potable water system and its proximity to sensitive aircraft components. As a result of this investigation, Sunwing developed and implemented its own procedures to ensure that the water line does not have an opportunity to freeze and to confirm integrity of the line prior to flight. We are currently working with the manufacturer to develop a solution to eliminate the problem at its source.

AIR CANADA

Air Canada's experience with an integrated SMS continues to be a very positive one and supports our first priority, which is safety. The benefits of SMS relate to efficiencies gained as a result of the implementation of a Safety Information Management System (SIMS) IT tool. Comprised of EtQ Reliance (R), IBI Webfocus (R) and iWay (R) products, SIMS facilitates continuous improvement in our safety processes, procedures and services via the systematic acquisition, analysis and measurement of safety of flight (hazard and occurrence) and quality (audit) data from across the entire airline.

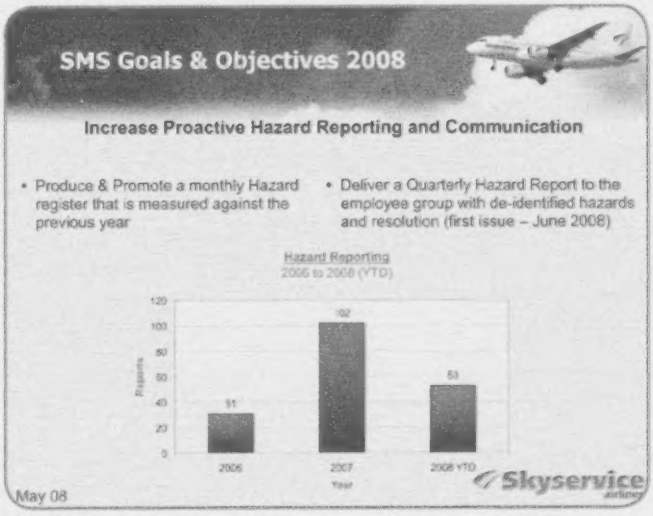
The following event involved a missed approach and diversion of a flight planned from Barbados to Montréal, Que., (Trudeau) with Albany, N.Y., as the alternate. The pilots initiated the approach to Montréal, but subsequently elected to carry out a missed approach procedure and proceeded to Val-d'Or, Que.

An SMS investigation was undertaken as a result of a passenger letter regarding this flight. The investigation revealed that the day in question was an extremely challenging one for the Air Canada operation because of a snowstorm that rolled through the eastern part of Canada. Approximately four hours into the flight, the flight crew received a revised flight plan from Air Canada flight dispatch with a change in the original alternate airport from Albany, N.Y., to Val-d'Or, Que. The reason for this change was that the weather in Albany had deteriorated and was now below the legally required limits, which precluded any possible approach at the airport. The weather in Montréal was blustery, with strong winds and blowing snow, but still well above the required limits for a safe landing. The Air Canada crew performed the missed approach in Montréal because the winds experienced during the approach were stronger than forecast and exceeded the crosswind limitations for the aircraft given the runway conditions. The flight later continued on to Toronto from Val-d'Or with Detroit, Mich., as the planned alternate airport, and arrangements were made to get the passengers to Montréal. The decision by the flight crew to abandon the approach was very appropriate and prudent under the conditions. All operational aspects associated with this flight were conducted in accordance with applicable Canadian Aviation Regulations (CARs) and the operational limits of Air Canada's Operating Certificate, and at no time did the operating crew compromise the safety of the passengers or of the flight by contravening any operational procedures.

SKYSERVICE

While implementing SMS at Skyservice Airlines, we have strived to empower our front-line staff to report hazards. Let's first look at a definition of hazard: a source of potential harm or a situation with a potential to cause loss.

In 2005, Skyservice embarked on a communication campaign to encourage our staff to identify hazards in the workplace. This campaign has led to the development of SMS Goals & Objectives in 2008 that will "Increase Proactive Hazard Reporting and Communication."



In this chart, you see an increase of 300 percent on hazard identification over the previous year. This has allowed the airline to make many proactive corrective and preventative actions that maintain our safety promise of "providing the highest level of safety for our customers and employees." We have made changes to procedures, training, and equipment based on hazards identified by our safety-committed employees. Our continuing goal is to make our program more proactive and to communicate the changes with our staff.

WESTJET

WESTJET: Aircraft Type B737-600

Following takeoff, the landing gear would not retract. With the gear lever in the "UP" position, the indications were as follows: three red lights and three green. The aircraft was levelled at 5 000 ft and flaps were retracted on schedule. Since the forward and overhead gear lights were indicating green, the crew placed the gear lever down again, and the gear warning lights extinguished. Confident that the gear was down and locked, the crew requested radar vectors to return for landing. The crew contacted local operations, briefed the cabin crew and guests, and landed without incident.

During the investigation, foreign debris was found in and around the alternate landing gear handle access door. If this door is not fully closed, landing gear retraction is disabled. The "flight deck detail cleaning" task card was amended to require the door and surrounding area to be cleaned and secured and to have an aircraft certification authority (ACA) check security of the manual gear extension handles and access door. Boeing was also contacted about including a gear disagree non-normal checklist for the B737NG as is done for other Boeing aircraft types. Additional follow-up included establishing a single point of contact in flight dispatch to co-ordinate company actions in similar situations.

WESTJET: Aircraft Type B737-700

An aircraft maintenance engineer (AME) reported that some main landing gear brake assemblies were being returned from overhaul without their bleed valves lock-wired. Brake assemblies do not always require bleeding after installation, so a missing lock-wire could go unnoticed. Under certain circumstances, this could create a risk of losing brake hydraulic pressure.

WestJet's Technical Operations Reliability Team co-ordinated initial follow-up. A fleet campaign was immediately undertaken to ensure that all brake assemblies in service and in stores were properly lock-wired. The issue was brought to the attention of the brake overhaul facility, which conducted additional training and quality audits. The WestJet Quality Assurance Team then took over follow-up and is now monitoring the status of all brake assemblies received. Current data indicates 100 percent compliance in the last several shipments.

AIR CANADA JAZZ

The introduction of SMS at Air Canada Jazz has fostered a culture of trust and self-reporting. The following report details the events that took place on board a Dash 8. This report was self-reported by the crew involved. In a punitive environment, we may not have received the report. Without the crew report, we would likely not have known about this event.

After climb out from Vancouver, B.C. (CYVR) the aircraft failed to pressurize. The crew did not notice as the caution light was obscured by sunlight. At FL190, the crew realized this and put on their oxygen masks and requested descent to 10 000 ft. They then proceeded into Portland, Ore. (PDX) and landed without incident.

In cruise, we received a call in the flight deck from the flight attendant that he was feeling light-headed and that some of the passengers were as well. The carbon monoxide indicator was checked and showed normal. The caution panel was then checked and the cabin pressure warning light was illuminated. A check of the pressurization panel revealed that the cabin was not pressurized. The crew donned oxygen masks and completed an emergency descent to 10 000 ft. Emergency checklist completed by the pilot not flying (PNF) (or first officer [F/O]).

After reaching 10 000 ft, a further descent continued until an uneventful landing in Portland. It was found that the cabin controller was in the dump position—the reason we assume the cabin did not pressurize. The captain completed a post-incident briefing with the crew and advised dispatch and maintenance control.

Contributory information

The master warning system failed to operate and advise of a problem. After the incident, it was checked several times with the advisory test switch and would not work until the cancel button was pushed many times, after which it functioned normally. F/O advised the cabin looked normal going through 10 000 ft. Other factors included the following: the aircraft was southbound with a late afternoon sun shining directly onto the caution light panel making it difficult to pick up an illuminated light. With the master warning inoperative, we were in cruise for 10 to 15 min before becoming aware of a problem.

The SMS investigation revealed that the crew had inadvertently left the cabin controller in the "dump" position. As part of the detailed incident report, Jazz Flight Safety recommended that:

1. A joint Air Line Pilots Association (ALPA) and maintenance project team be assembled, in conjunction with Bombardier, to determine if it is possible and practical to design a guarded and visible switch to indicate when the pressurization is not in the normal position.
2. A joint ALPA, flight technical, maintenance and Bombardier team examine the possibility and feasibility of retrofitting the present Dash 8 series 100 and 300 aircraft with an independent aural warning system that would alert the pilots of an aircraft cabin altitude greater than 8 500 ft above sea level (ASL).
3. A joint ALPA, flight technical, maintenance and Bombardier team examine the possibility and feasibility to retrofit the present Dash 8 series 100 and 300 aircraft with an independent aural warning system to indicate any situation that would normally enable the master warning light circuitry.
4. Training and standards management and line personnel liaise with Bombardier and other Dash 8 operators at the next users forum to determine if there is a possibility to streamline the present checklist to minimize any unnecessary checklist items.
5. Training and standards personnel discuss the value of listening to exact checklist responses versus the requirement to physically check the position of switches deemed to be critical to the correct operation of the aircraft in flight to determine the direction given to pilots operating this type of aircraft.

Closing Remarks by Jennifer Taylor—Director, National Operations

This article began by recognizing that change is the one constant in the aviation industry. The future holds increased traffic levels, supersonic flight, green skies and many other technological improvements. At the same time, the industry as a whole is embarking on an innovative approach to improve an already excellent safety record. The implementation of SMS, where personal and organizational accountability, robust safety management processes and procedures are all in place as a system, points the way to a safer future.

One segment of the aviation community that is leading the way in this regard are our Canadian CAR 705 operators. I am very pleased that the six carriers overseen by National Operations have been willing to share examples of their experience with SMS with the broader aviation community. From strategic corporate plans to effective crew decision making; from safety-based decision making regarding fleet retrofits to self-reporting of incidents so that others could learn from the situation: each of these write-ups demonstrates elements of the promise that SMS holds for the future. △

TC AIM Fast Fact: Composite Flight Plan or Flight Itinerary—VFR and IFR

A composite flight plan or flight itinerary may be filed that describes part(s) of the route as operating under VFR and part(s) of the route as operating under IFR. All rules governing VFR or IFR apply to that portion of the route of flight. A composite flight plan or flight itinerary shall not be filed for an aircraft that will enter airspace controlled by the U.S. Federal Aviation Administration (FAA), including Canadian domestic airspace (CDA) delegated to the FAA, as composite data cannot be correctly processed between NAV CANADA and FAA systems.

A pilot who files IFR for the first part of a flight and VFR for the next part will be cleared by ATC to the point within controlled airspace at which the IFR part of the flight ends. A pilot who files VFR for the first part of a flight and IFR for the next part is expected to contact the appropriate ATC unit for clearance prior to approaching the point where the IFR portion of the flight commences. If direct contact with an ATC unit is not possible, the pilot may request ATC clearance through a flight information centre (FIC). It is important that the flight continue under VFR conditions until appropriate IFR clearance within controlled airspace is issued by ATC and acknowledged by the pilot.

Source: Transport Canada Aeronautical Information Manual *(TC AIM) RAC 3.8*
www.tc.gc.ca/CivilAviation/publications/tp14371/RAC/3-1.htm#3-8

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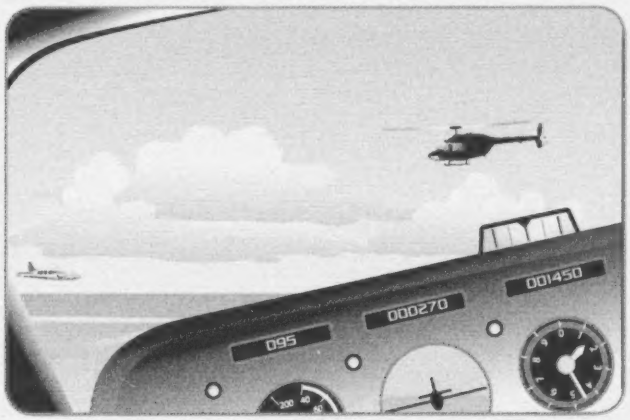
Operations Specifications: An Inconvenient Truth? ..... page 22

Ahead to the Past—A Little History

by Tom Fudakowski, Chief, ANS Operations Oversight, National Operations, Civil Aviation, Transport Canada

The old saying "the more things change, the more they are the same" probably has extensive application with everything to do with aviation. Yes, we have made huge leaps in technologies, but the underlying principles remain the same. Our domestic airspace structure has evolved over the past five decades in concert with increasing air traffic volumes. Nevertheless, controlled airspace in southern portions of domestic low-level airspace represents a miniscule volume of the total—not surprising, at least in the Canadian context, when you consider that the global aircraft fleet could probably be contained in a cubic nautical mile of airspace. That comparison is no doubt a little far-fetched given that aircraft are not stationary and move in four dimensions. For that reason, the class of airspace is tailored to traffic densities and diversity of operations.



When you operate in visual meteorological conditions (VMC), the principle of "see and avoid" has primacy

The term *controlled airspace* in and of itself may mislead some people. Too often, it tends to be associated exclusively with air traffic control (ATC) when in fact *controlled airspace* has two separate meanings. The more important association should be with *regulated airspace*, that is, airspace in which specific operating rules and minima apply. The ATC functions may apply, but only to flights operating under IFR rules. The VFR flight, on the other hand, may not be subject to any ATC requirements, but flight visibility and horizontal and vertical distances from cloud apply. By the same token, uncontrolled airspace simply means there is no ATC separation service provided, but the rules of flight are regulated and must be complied with, as minimal as they are. All of this is naturally in the interest of safety and collision avoidance. When you operate in visual meteorological conditions (VMC), the principle of "see and avoid" has primacy, albeit the responsibility shifts to ATC as you move up the airspace classification scale. Nonetheless, self-preservation would suggest that an attentive look out for other traffic is wise under any situation.

For those reasons, particularly when operating in Class E or lower classification airspace, we've always had operating rules to mitigate the risks of collision. The universal hemispheric rules regarding proper altitude for direction of flight is a case in point. We started out with the rule of odd or even altitudes when in level flight for both VFR and IFR operations. There was, however, a caveat that required a VFR flight to cross a controlled airway at an angle of 45° or greater. Otherwise, if you were crossing an airway at a lesser angle or actually navigating along the airway, you cruised at the odd or even plus 500 ft altitudes. All this made eminently good sense since IFR operations tended to be concentrated at the lower levels and cruising speeds were not that divergent. Then, as higher performance aircraft were introduced into service and operating altitudes rose into the teens, *block airspace* was introduced. A VFR flight required the filing of a controlled VFR (CVFR) flight plan and an ATC clearance to operate along airways. This requirement applied above 9 500 ft above sea level (ASL) east of 114° west and 12 500 ft ASL west of this meridian. With the increase in controlled airspace and airways, it became apparent that the odd or even plus 500 ft airway crossing requirements were no longer practical nor met their intended purpose. This resulted in the cruising altitude order requiring all aircraft, irrespective of the mode of flight, to maintain an odd or even altitude when in level flight. Fortunately, by that time, larger and ever-higher-speed aircraft had migrated to the high teens and flight levels and the VFR operations were left the lower strata to themselves. Interestingly, as traffic volumes continued to grow, there was a need to revisit some of these rules and adapt them to existing realities. One of those realities was harmonization with our neighbours to the south, which created the VFR rule for flight above 3 000 ft above ground level (AGL) of odd or even plus 500 ft altitudes.

Airways may not have been very crowded, but some wise operating practices were applied. When flying along an airway, particularly after the introduction of VHF omnidirectional ranges (VOR), you always shaded slightly right of centreline. Prior to that, navigation aids did not offer the level of accuracy to generate great concern as their cross-track error provided lots of dispersion along the routes. With the four-course low frequency ranges (LFR), an intersection formed by two courses could cover a couple of counties. In fact, the width of the courses allowed ATC to climb or descend aircraft in opposite direction by instructing the aircraft to maintain well right of the course—an approved separation criterion. Putting this into today's environment would make some folks' hair stand on end. In today's navigation-rich environment, with precision measured in meters, if not centimeters, and point-to-point navigation capability, some of these same operating practices are formally returning. On the North Atlantic, with daily unidirectional tracks published to take best advantage of minimum crossing times, off sets of up to 2 NM are now a standard operating practice. As you can see, in some instances, we have come full circle.

Airport control zones evolved over time. Some may be surprised that a control zone was not automatically associated with ATC service. Control referred to regulating the weather limits required to conduct VFR operations, which was really analogous to what we know as mandatory frequency (MF) areas, except that radio communication or position reporting was not a requirement. Control zones with operating control towers, on the other hand, were there for the purpose of airport control service and simply controlled aircraft and vehicle movements on runways and taxiways. Air traffic controllers did not *per se* control movements in a control zone; that came later. You could fly no radio (NORDO) into an international airport without pre-arrangement, execute proper circuit joining procedures and wait for the green light. That obviously did not last and radio communication became a mandatory requirement, but only at those locations whose control zone was designated as a Positive CZ.

The proliferation of various categories of airspace and nomenclature, each with differing operating rules, was not conducive to easy comprehension. Canada developed—and was in fact the first state to introduce—the now universally accepted airspace classification scheme. Irrespective of what a particular airspace may be referred to, it is its classification from A to G that governs the rules of conduct. Thus a control zone simply describes a volume of airspace around an aerodrome, or likewise, a terminal control area (TCA), but its classification governs the operating rules.

This is all food for thought when operating in today's increasingly complex airspace structure. But, that fundamental principle of maintaining vigilance and watching for other traffic applies ever more today than in the past. No matter what class of airspace you are operating in, a clear understanding of rules and alertness may save you anxious moments if not more.

Keep a sharp look out and watch for other aircraft. △

Instrument Approach Non-Conformance at Uncontrolled Aerodromes Within Controlled Airspace

by Mike Paddon, Civil Aviation Safety Inspector, System Safety, Atlantic Region, Civil Aviation, Transport Canada

A recent search of the Civil Aviation Daily Occurrence Reporting System (CADORS) database indicates that there may be some confusion or misinterpretation of procedures associated with adherence to instrument approach clearances, as issued by air traffic control (ATC), to aircraft that are conducting approaches into uncontrolled aerodromes that lie within controlled airspace. Class E airspace, for example, is controlled airspace for IFR traffic, yet, in a number of instances, aircrews have deviated from established approach procedures. The following accounts are representative of events that have been captured in the CADORS.

> The twin turbo-prop commuter aircraft enroute from ____ to ____ was cleared for a straight-in instrument landing system (ILS) XX approach via ____. The pilot received and read back the clearance correctly. The pilot deviated from the clearance without ATC authorization, commencing a right 360° turn after crossing through the approach to Runway XX and then rejoining final approximately four miles from the threshold…
>
> The arriving aircraft was cleared for a straight-in back course Runway YY approach via ___. The pilot accepted the clearance and was switched over to the flight service station (FSS). Ten minutes later the pilot turned right toward the beacon thus cutting inside the specified fix by six miles without advising the FSS or requesting a change to the clearance.
>
> The arriving aircraft deviated from the approach clearance (straight-in back course Runway ZZ via the intermediate fix [IF]) without prior approval. There was departing traffic on Runway ZZ…

Clearly, any such deviations from approach clearances may present a hazard in terms of potential for conflict with other arriving and departing traffic. It is incumbent upon crews to contact ATC and request a clearance amendment rather than acting unilaterally to expedite or otherwise modify the approach profile. Under circumstances where some doubt or confusion may exist regarding an approach clearance, as issued and accepted, timely and concise clarification with the ATC unit is appropriate. If, after switching from ATC to a mandatory frequency, an approach clearance amendment is desired, a request can be communicated to the flight service specialist who can then facilitate the request with ATC.

Canadian Aviation Regulation **(CAR) 602.127(1) states the following:**

> " Unless otherwise authorized by the appropriate air traffic control unit, the pilot-in-command of an IFR aircraft shall, when conducting an approach to an aerodrome or a runway, ensure that the approach is made in accordance with the instrument approach procedure."

In an effort to dispel any misinformation that may exist, an extract from section RAC 9.3 of the Transport Canada *Aeronautical Information Manual* (TC AIM) is reproduced below:

"9.3 APPROACH CLEARANCE

> ....When an approach clearance is issued, the published name of the approach is used to designate the type of approach if adherence to a particular procedure is required. If visual reference to the ground is established before completion of a specified approach, the aircraft should continue with the entire procedure unless further clearance is obtained.

Examples:

> *CLEARED TO THE OTTAWA AIRPORT, STRAIGHT-IN ILS RUNWAY 07 APPROACH.*
>
> *CLEARED TO THE TORONTO AIRPORT, ILS RUNWAY 06 LEFT APPROACH.*
>
> The number of the runway on which the aircraft will land is included in the approach clearance when a landing will be made on a runway other than that aligned with the instrument approach aid being used.

Example:

> *CLEARED TO THE OTTAWA AIRPORT, STRAIGHT-IN ILS RUNWAY 07 APPROACH/ CIRCLING PROCEDURE SOUTH FOR RUNWAY 32.*
>
> NOTE:
> If the pilot begins a missed approach during a circling procedure, the published missed approach procedure as shown for the instrument approach just completed shall be flown. The pilot does not use the procedure for the runway on which the landing was planned.

At some locations during periods of light traffic, controllers may issue clearances that do not specify the type of approach.

Example:

> *CLEARED TO THE LETHBRIDGE AIRPORT FOR AN APPROACH.*
>
> When such a clearance is issued by ATC and accepted by the pilot, the pilot has the option of conducting any published instrument approach procedure. In addition, the pilot also has the option of proceeding by the route so cleared by ATC in a previous clearance, by any published transition or feeder route associated with the selected procedure, or by a route present position direct to a fix associated with the selected instrument approach procedure. Pilots who choose to proceed to the instrument procedure fix via a route that is off an airway, air route or transition are responsible for maintaining the appropriate obstacle clearance, complying with noise abatement procedures and remaining clear of Class F airspace. As soon as practicable after receipt of this type of clearance, it is the pilot's responsibility to advise ATC of the type of published instrument approach procedure that will be carried out, the landing runway and the intended route to be flown.
>
> This clearance does not constitute authority for the pilot to execute a contact or visual approach. Should the pilot prefer to conduct a visual approach (published or non-published) or a contact approach, the pilot must specifically communicate that request to the controller.

Upon changing to the tower or FSS frequency, pilots should advise the agency of the intended route and published instrument approach procedure being carried out.

The pilot should not deviate from the stated instrument approach procedure or route without the concurrence of ATC because such an act could cause dangerous conflict with another aircraft or a vehicle on a runway.... "

When operational pressures enter the equation and are compounded by a less than complete understanding of the approach clearance, the potential for conflict is increased. If in doubt, communicate any concerns and seek clarification or amendment from the appropriate air traffic services (ATS) unit. △

Operations Specifications: An Inconvenient Truth?

by Rob Freeman, Program Manager, Rotorcraft Standard, Operational and Certification Standards, Standards, Civil Aviation, Transport Canada

As with much in life, aviation includes both good and bad—somewhat paradoxically—at the same time. When you were a kid, the Sunday trip to Granny's meant the hassle of dressing up in scratchy clothes and behaving well while being terminally bored for hours. However, the reward was usually a fancy whipped-cream dessert and extra candy from the big bowl by the stained glass window. You learned to put up with it.

Similarly, the actual flying of helicopters is the best part of aviation [*author's opinion*]. A technically challenging flight, skillfully and safely completed provides its own rewards and satisfaction. For older, grumpier pilots working on that fourth marriage, in-flight may be the only time you will ever see their pre-alimony smile.

The understanding of the legal considerations associated with flying is considerably less fun. A more cynical person might suspect that ground-bound administrators invented flight regulations out of jealousy, to detract from an otherwise perfect occupation.

What follows here is a quick review of the less pleasant but critical aspects of understanding air operator certificates (AOC), operations specifications (Ops Specs), and related documents, and operating within that regulatory framework. It will be a brush up for most, thankfully, but perhaps a wake-up call for others. All the same, everybody listen up. Your friends at Transport Canada (TC) have determined that it is fundamental need-to-know stuff for your holistic aviation well-being.

The issue

Through post-incident analysis, it is apparent that some operators and their employees are not aware of their obligations associated with the issuance of their AOC.

Sample questions badly answered include the following:

- "What are the limits and conditions of the Ops Specs that apply to your operations? How would you determine this information?"
- "Do you know when you have to apply for an authorization? What is the procedure?"
- "Do you fully understand the *Canadian Aviation Regulations* (CARs), the *Commercial Air Service Standards* (CASS), and definitions that are tied to your Ops Specs, authorizations or exemptions by reference?"
- "Are there any company standard operating procedures (SOPs), training issues, or possibly aircraft limitations that need to be addressed in complying with specific conditions listed in your Ops Specs? How is this handled in your company?"

The contract or Them and us

As everyone involved in the helicopter business should know, the AOC is the foundation for commercial air operations. Tied to the licence issued by the Canadian Transportation Agency (CTA), these documents form the contractual basis between the Government of Canada and the AOC holder for permitting commercial air operations. That's right—it's a legal contract.

Attached to the AOC are various Ops Specs that define the types of services offered and include conditions that must be met. Ops Specs are normally issued for recurring activities. For one-time or limited requirements, authorizations may be issued in lieu of Ops Specs. Exemptions and approvals are other tools available to TC to allow operators' specialized activities.

All of these legal instruments have a common theme: permitting the operation while ensuring that safety and

the public interest are served. By issuing these documents, TC is confirming that the appropriate risk assessment and due diligence exercises have been completed and that the operator has been deemed competent and capable of operating within the regulatory limitations and imposed conditions.

Be aware that the Regulations, Standards and definitions are documents and terms written to comply with federal legal phrasing criteria, and as such, may be misinterpreted by the layman as to intent or application. They have to be read fully and in context, and simple words such as "and" or "or" completely change the obligations imposed. If you are not certain of the ramifications of any regulatory text, ask someone who knows for their advice—preferably your principal operations inspector (POI).

The contract or *Your obligations*

For the operator, all of these documents are contractual obligations. Limits and conditions specified therein must be met at all times for the operation to go forward as intended and legally authorized. And just like a business contract, there are penalties and unpleasant consequences associated with non-performance.

Operators who do not meet the conditions specified when conducting Ops Specs or authorized work place themselves in great peril if an accident should occur. Legally, they are in no man's land and may have lost the protection afforded by the authorizing documents. A clear understanding of this point is critical. If you fail to observe all of the conditions of the AOC, the Ops Specs, the exemptions or other related documents, you are on your own if bad things happen. Ignorance of the requirements is not a viable defence.

Pilots, crew members, maintainers, and others, acting as agents of the operator, have a legal obligation to conduct their work in conformance with these same restrictions and limitations. Failure to do so jeopardizes not only the safety of the operations, but may also leave the whole organization open to civil or criminal lawsuits, actions taken under the *Aeronautics Act* including fines and loss of personal licences, or suspension of the AOC itself.

Fortunately, the path to enlightenment is straightforward. Take a careful look at your AOC and Ops Specs to start with. Make a list of all the obligations and conditions related to each Ops Specs so you can tick them off when verified as complied with. Make sure that you thoroughly understand the applicable regulatory references. Operational managers, above all, have a duty of care under the CARs to ensure that they establish and oversee a safe operation. They need to inform, provide for training, and direct the crews concerning their obligations. The crews must take the initiative to comply fully in carrying out their duties and responsibilities.

If you have any questions, you can always contact your regional POI. TC has a large pool of legal expertise, and clarifications or interpretations can be drafted or verified fairly quickly. At the risk of being annoying and repetitive, the best proactive protection for an operator is to be fully cognizant of the conditions and limitations attached to any authority issued by TC, and then abide by them.

Having an incident is traumatic enough. Having an incident and then finding out that you were in violation of some significant aspect(s) of your AOC is a double whammy. It can really ruin your day. △

BLACKFLY AIR

Hey Nick, great news! We're getting a new twin-engine helicopter, and you're leaving Friday for a type rating in Florida.
H 2000
Euh...that's great Ma, but I'm leaving Thursday on a ski trip to Fernie. I've had it planned for a year.
Sorry Slick, the next opening is in ten months, and I need you ready in six weeks. You'll have to postpone the skiing.
But my ailing parents are meeting me there!
Tell you what Nick, I'll upgrade your room to a suite, and your parents' flight to Florida is on me. You can thank me later. Bye!
Wow...unbelievable. That woman sure knows what she wants!

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It's Not Just Paperwork

by Brian Whitehead, Chief, Policy Development, Standards, Civil Aviation, Transport Canada

Every now and again, an air operator has to be suspended for failure to comply with requirements. Almost inevitably, a representative of the operator will then be quoted in the press, saying something along the lines of: "The aircraft are all perfectly airworthy; it's only a paperwork problem." Now, saying that it's "only" a paperwork problem, is a bit like a bank manager saying that he can't balance the books, but there's a lot of money in the vault! The fact is, that without the paperwork, there's no way to know if the aircraft are airworthy. With the complexity of modern aircraft, the days when we could rely on a visual inspection alone are long gone. Accurate record keeping is now essential.

Record keeping covers a lot of territory. For example, it can include the records that an approved maintenance organization (AMO) keeps to show compliance with approved procedures. Some of those records, such as the so-called "dirty fingerprint" records contained on job cards, etc., may relate to specific aircraft. Others may be more general, covering personnel training, tool calibration, ground equipment, quality audit reports, and so on. The AMO retains those kinds of records to support its own operations.

This article will concentrate on another kind of record—the aircraft technical records required by *Canadian Aviation Regulations* (CARs) 605.92 through 605.97. In this context, the term "technical record" is not restricted to information written on the pages of a logbook. It also includes x-rays, drawings, flight test reports, etc. In short, any information that has direct bearing on the physical state of the aircraft, or its compliance with standards, is part of the aircraft technical records. The aircraft operator retains these records, which must accompany the aircraft throughout its working life. Their purpose is to establish the aircraft's condition and compliance with its type design. Transport Canada publishes logbooks that are suitable for many small aircraft, but no one document can cover all circumstances, so operators of more complex aircraft are encouraged to develop their own systems.

For the purposes of CAR 605, aircraft technical records consist of: a journey log; separate records for the airframe, each installed engine and each variable-pitch propeller (often known collectively as the "technical log"); and a weight and balance report. The airframe, engine and propeller records may be further subdivided into separate records for each of the main components involved. This usually applies to engine modules, for example, or to the main transmission components of helicopters. The technical records as a whole are transferred, along with the aircraft, when the latter is sold or leased. They must include the minimum information specified in Schedules I and II of CAR 605.

The journey log is a day-to-day working document. It serves as the formal means of communication between successive pilots, and between pilots and maintenance personnel. As the name implies, the journey log travels with the aircraft, and provides an up-to-date "snapshot" of the aircraft's condition at any given point in time. It contains a record of each flight, including details of any problems that occurred, as well as any other information needed by the pilot, such as any outstanding defects, the current empty weight and centre of gravity, and the details of the next scheduled maintenance action. Journey logs need only be retained for one year after the last entry.

The journey log serves as the formal means of communication between successive pilots, and between pilots and maintenance personnel

The airframe, engine, propeller, and weight and balance records must be retained for the life of the aircraft (i.e. until it is removed from the civil register). The only exceptions are the records of repetitive inspections. They can be discarded whenever the inspection is repeated. Note that this exception only applies to the inspections themselves, and not to the rectification of any defects found during the inspections—that information must also be retained for the life of the aircraft.

All maintenance recorded in a journey log must be transcribed to the applicable airframe, engine or propeller record (and, where applicable, to the weight and balance report) within 30 days of the events concerned. Where practical (during a major check, for example), maintenance entries can be made directly in the permanent record, bypassing the journey log altogether. This option is only available provided the entire job is completed, and the entries made, before the next flight. Snags that can't be fixed before the next flight must be entered in the journey log, so that the pilot has an on-board record of the aircraft's condition. Temporary changes to the aircraft weight and balance (such as when non-essential equipment is removed for maintenance) should also be recorded in the journey log, and the necessary amendment should be made to the permanent weight and balance record within 30 days. If the aircraft is restored to its original empty weight and centre of gravity within 30 days, there is no need to amend the weight and balance report, although the details of the maintenance done (i.e. the equipment removed and replaced) will still have to be transcribed.

When a component with its own permanent record (an engine, for instance) is removed from one aircraft and installed on another, the record is also transferred, and becomes a part of the record for the new aircraft. The transfer is recorded in the engine record, so it should be possible to retrace every aircraft on which the engine has been installed. The transfer is entered in the airframe record as well, so it should also be possible to identify every engine (and other major component) that has ever been installed on that airframe.

Smaller parts have technical records as well, but they are not as obvious, because the entire record doesn't travel with the parts. When a component is installed, its release tag is incorporated into the records of the higher assembly. When it is removed, the identity of that higher assembly is entered on a new tag, along with details of the part's condition. After repair, the item may be installed on another higher assembly, and the process is repeated. Hence, the technical record for the part is distributed among the records of every aircraft on which it has ever been installed. Provided everyone did their job properly, the record can be reassembled by following the trail.

Badly maintained records can cost the operator thousands of dollars. At worst, they can expose the aircraft to serious risk. Record keeping isn't fun, and most aircraft maintenance engineers (AME) don't take kindly to it. Once a job is done, our natural instinct is to close up and move on to the next one. But technical records are just too important to give them anything less than our full attention. It's not "just" paperwork. △

Fatigue Risk Management System for the Canadian Aviation Industry: An Introduction to Managing Fatigue (TP 14572E)

This is the first of a seven-part series to highlight the work done by the Fatigue Risk Management System (FRMS) Working Group, and also to highlight the various elements of the FRMS Toolbox. This first part refers to TP 14572E. We encourage our readers to consult the complete documentation by visiting www.tc.gc.ca/civilaviation/SMS/FRMS/menu.htm. *—Ed.*

Being tired at work can be just as dangerous as taking alcohol or drugs. You can lose concentration, misjudge speed and distance, react more slowly—you might even fall asleep. Being tired can also make you moody and irritable, and can cause you to take risks. Any one of these problems could put you and other people in danger.

When you work shifts, you're bound to feel tired sometimes. You're out of step with your body's natural sleeping and waking rhythms. TP 14572E gives you an overview of the risks associated with fatigue, and offers some strategies to help you manage the effects of fatigue at work and make sure you get the rest you need to be fit for duty.

Fatigue is widely recognized as a significant safety hazard, not just to you and your co-workers, but to the general public. That's why Transport Canada commissioned a set of tools and guidelines to help the Canadian aviation industry set up FRMSs.

FRMSs recognize that it's everyone's responsibility to manage fatigue risk. Employers should make sure that work schedules give employees adequate opportunities for rest between shifts. In turn, employees are responsible for making sure they use those opportunities to get the sleep they need to be fit for work.

An important part of any FRMS involves teaching employees and managers about fatigue as a safety hazard and how to better manage their own fatigue.

Causes and consequences of fatigue

What causes fatigue? How much sleep we need varies from person to person, but most people need an average of seven to nine hours of sleep a night. If you get less than you need over several days, that lack of sleep will build up into a sleep "debt." Losing two hours of sleep a night for four days can make you as tired as though you lost a whole night's sleep. The only way to pay back your sleep debt is by getting some additional "recovery" sleep.

The human body runs on a 24-hr clock, programmed to sleep at night and be awake during the day. Working when your body is supposed to be sleeping can make it hard to get good quality sleep. Not only do you not sleep as well, some research suggests that night-shift workers can lose one to three hours of sleep per day compared to day-shift workers. Six hours of sleep during the day is not the same as six hours of night sleep.

Your body clock also controls your body's daily cycles, such as hormone production, digestion, temperature, and sleepiness. There are two times during the day when you're more likely to feel drowsy: in the early morning between midnight and 6 a.m., and in the mid-afternoon.

Your sleep, too, runs in cycles. Over the course of the night, you move several times from a light sleep to a deep dreaming sleep and back to a light sleep. How long each cycle runs varies from person to person, but it's usually somewhere from 60 to 90 min. It's the deepest sleep that you need to recover best from fatigue.

It is not true that we need less sleep as we get older—we simply have more trouble getting what we need.

Beyond not getting enough sleep, feelings of fatigue can also be brought on or made worse by conditions in your workplace. High-pressure demands, long shifts, stress, and even things like poor lighting, constant noise, and poor weather can make you feel more tired. Not taking breaks during your shift will also increase your feelings of fatigue.

Balancing the demands of shift work with your family and social life can also be stressful and make it hard to get the sleep you need to be fit for duty.

Consequences of fatigue

Being fatigued can have an effect on many aspects of your life. Many people suffer from mood swings, which can hurt your relationships at work and at home. Some people gain weight. Others find it harder to get motivated at work or at home. You can become frustrated trying to balance the need for more sleep with the need to spend time with friends and family.

Many people who work shifts feel socially isolated, which only adds to the stress and overall feeling of fatigue. In the long term, shiftwork can lead to more serious health problems, such as heart disease or gastrointestinal problems such as ulcers.

On the job, fatigue can be a serious safety hazard. Research has found that losing just one night of sleep can impair your performance almost as much as having too much alcohol to legally drive. Your reaction time is slower, you have trouble concentrating or remembering things—you may even fall asleep on the job. There's a much greater risk that you'll make a safety-critical mistake. Being fatigued can make you a risk to yourself, your co-workers, and even the public. It's not just at work that being fatigued can be dangerous. There's a real risk that you'll fall asleep at the wheel while driving home after a long shift.

Consequences of fatigue	
Individuals	• Increased sleepiness • Increased risk of accident • Increased stomach upsets • Decreased motivation • Mood swings or depression
Organizations	• Increased safety risk • Increased sick leave • Increased staff turnover • Decreased productivity • Decreased morale
Communities	• Increased safety risk for general public • Increased use of medical services • Decreased community participation

For more, including strategies to manage fatigue, visit www.tc.gc.ca/CivilAviation/SMS/pdf/14572e.pdf. △

National Aircraft Certification Hosts 5th Delegates Conference in May 2009

The 2009 National Aircraft Certification Delegates Conference will be held at the Crowne Plaza Hotel in Ottawa, Ont., from May 25–27. The previous conference—held in 2006—attracted over 500 participants, and a similar turnout is predicted for 2009. All Aircraft Certification delegates are invited to attend. To date, registration has been very successful: the conference is already over 75 percent sold out!

The first objective of the conference is to educate delegates and Transport Canada personnel on regulatory developments, policy initiatives, and new technology. The second objective is to foster improved communication between industry and Transport Canada National Aircraft Certification, which is essential to meet the challenges facing the industry and maintain Canada's leading role in aviation.

The conference includes a plenary session and specialist sessions in flight test, avionics and electrical software, aircraft structures, powerplants and emissions, fuel and hydro mechanical control systems, and occupant safety and environmental systems.

We encourage you to take this opportunity to strengthen your working relationship with Transport Canada and Aircraft Certification delegates. Invitations to the conference have been sent to all delegates. If you have not yet received an invitation, please register electronically via www.tc.gc.ca/aviation/activepages/DC, or by contacting Glenn Adams at (613) 941-6257, or via e-mail at glenn.adams@tc.gc.ca. An electronic confirmation of your registration will be sent to you by e-mail.

The Organizing Committee, which is made up of representatives from industry and Transport Canada, has developed a conference program designed to appeal to all delegates. The program will be available on the Web site listed below in early 2009.

For more information on the conference, please visit www.tc.gc.ca/CivilAviation/certification/delegations/2009DelegatesConference.htm. △

Learning From Our Past Mistakes: A310 Run-up Ends in Collision

A story worth reading again, from Aviation Safety Maintainer *3/1996*

The maintenance crew of an Airbus A310 was conducting a normal ground run-up after removing and re-installing both engines. The assigned technicians were qualified and current, and the task routine. But things went suddenly very wrong. As a result, both an expensive aircraft and a building suffered extensive damage.

Both engines were running when the tech-in-charge noted an engine fuel gauge reading high. Suspecting a gauge problem, he requested an observer to pull the landing gear proximity and relay control systems flight/round circuit breakers (CB). He believed (wrongly) that this action would allow him to read and record the correct fuel flow value from the appropriate computer screen. The CBs were pulled, and three seconds later, the aircraft began to move forward and gain speed. All attempts to apply brakes or otherwise stop the aircraft failed and it hit a building.

System deficiencies are evident throughout the lengthy report. The company has a very effective safety program on the operational side, enabling it to respond to safety issues. However, no one in the maintenance organization reports to the safety director. As a result, maintenance cannot be and was not proactive or effective in safety matters, so the tech-in-charge was not trained in run-up breakaway procedures. Furthermore, the maintenance organization did not record or disseminate to all employees information about two previous breakaway occurrences during A310 run-ups.

The report targets the following system deficiencies leading to this accident:

- The run-up checklist required blocking the mains with large chocks.
- The only pair of large chocks were at another base and unavailable.
- The flight/round CBs were pulled without full knowledge of the consequences.
- Pulling the flight/ground CBs disabled all wheelbrakes, nose steering, and engine thrust reversers.
- Small chocks did not and could not prevent the aircraft movement.
- The engine run-up course did not teach breakaway procedures.
- Neither the procedures nor the run-up check list required the CBs to be pulled.
- The maintenance personnel involved were not told about two previous occurrences of A310 run-up breakaways.
- The maintenance organization's safety program did not identify safety deficiencies within the organization.

As a result of this accident, the manufacturer will revise the A310 manual to include a warning that pulling the flight/ground CBs will interrupt the normal operation of the brakes; and the maintenance organization will include breakaway training to all employees involved in engine ground run-ups.

(Ref.: TSB Report A95P0246)

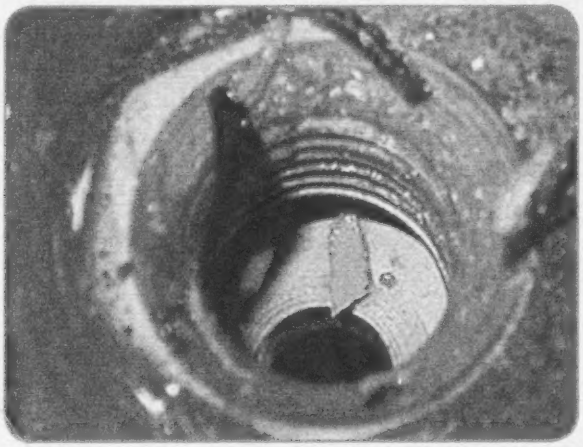
RECENTLY RELEASED TSB REPORTS

The following summaries are extracted from Final Reports issued by the Transportation Safety Board of Canada (TSB). They have been de-identified and include the TSB's synopsis and selected findings. Some excerpts from the analysis section may be included, where needed, to better understand the findings. We encourage our readers to read the complete reports on the TSB Web site. For more information, contact the TSB or visit their Web site at www.tsb.gc.ca. *—Ed.*

TSB Final Report A05O0146—Engine Power Loss

On July 18, 2005, a float-equipped Cessna 185F was en route to its home base at Orillia, Ont., after two passengers and their belongings were picked up at a remote fishing camp about 21 mi. to the east of Orillia. After takeoff, the aircraft climbed to approximately 1 000 ft above ground level (AGL) and proceeded towards Orillia. All engine parameters were normal until a few minutes into the flight, when the engine (Teledyne Continental IO-520-D) lost power. The pilot moved the mixture control to full rich and selected the auxiliary electric fuel pump on. The engine regained power, and the flight continued towards home base, about five miles away. Shortly thereafter, the pilot switched off the auxiliary fuel pump and the engine immediately lost power. The pilot applied full throttle, switched fuel tanks, and re-selected the auxiliary fuel pump on. However, the engine did not regain power.

An emergency landing was performed in a wetland area at 13:08 Eastern Daylight Time (EDT). After touchdown, the aircraft travelled a short distance over the soft, wet ground, struck a tree, and came to a stop. One passenger received a minor injury, and all occupants evacuated the aircraft safely. The aircraft was substantially damaged. The pilot was able to maintain radio and cellular telephone communications with another company aircraft flying in the area and with his home base. A short time later, the three occupants were evacuated by a search and rescue helicopter.



Piece of thread sealant in valve seat

Findings as to causes and contributing factors

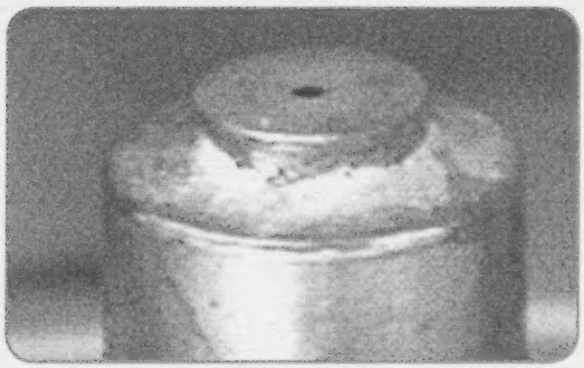
1. A piece of thread sealant lodged in the bypass valve of the engine-driven fuel pump created a reduction of fuel pressure, preventing normal engine operation.
2. A poor electrical connection within the auxiliary fuel pump resulted in intermittent operation of the pump. When the pilot re-selected the pump to provide additional fuel pressure to the engine, it did not operate.

TSB Final Report A05W0222—Engine Torching

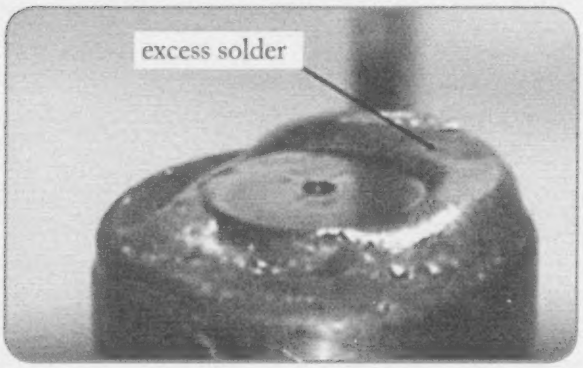
On October 30, 2005, a Boeing 737-900 aircraft was scheduled to take off at 07:00 Mountain Standard Time (MST), on its first flight of the day, from Calgary International Airport, Alta., to Los Angeles International Airport, Calif. The aircraft was pushed back across the apron from departure Gate 26. Following a normal start on the left engine, the crew initiated a start on the right engine. During the start sequence, the right engine discharged a large quantity of flame and smoke from the tailpipe, with smoke eventually entering the aft cabin. The engines were shut down, and all 113 passengers were evacuated using the emergency slides on the two left-side main doors, away from the right-engine tailpipe fire. The flight crew requested aircraft rescue and firefighting assistance, and the trucks arrived as the passengers were evacuating. By this time, there was no longer any flame or smoke visible. There were no injuries to passengers or crew. Initial examination determined that the fire was contained within the engine flow path (CFM 56-7B26, serial number 890392). There was no damage to the engine or the aircraft structure.

Findings as to causes and contributing factors

1. Excessive solder on a jet pipe nozzle in the overhauled electro-hydraulic servo valves (EHSV) reduced the clearance area so that particle contamination allowed binding, resulting in a nozzle position that commanded excessive fuel flow.
2. The manufacturer's quality assurance monitoring did not detect the excessive solder on the jet pipe nozzle, allowing the nozzle back into service.
3. Excess unburned fuel, caused by the excessive fuel flow, ignited as it exited the engine and tailpipe, resulting in severe external torching.



Nozzle with a normal profile



Nozzle from occurrence EHSV

Findings as to risk

1. When the evacuation order was given, the evacuation checklist was not complete and, consequently, the left engine was not yet shut down. When the aft left door was opened and the slide deployed, engine airflow could have resulted in injuries to passengers attempting to use the slide.
2. The closed cockpit door likely reduced the effectiveness of communications between the cabin and flight deck crews, and prevented the pilots from directly assessing the amount of smoke in the cabin.

Other finding

1. It is possible that the digital display format for fuel flow had a bearing on the flight crew's ability to detect the abnormal fuel flow during the start of the No. 2 engine.

Safety action taken

Honeywell International Inc.

Honeywell International Inc. inspected all EHSV units returned for overhaul since the occurrence. By June 15, 2006, 117 returned valves had been inspected with no anomalies detected. The overhaul process was subjected to an internal quality review, and changes were made to prevent a recurrence. As well, the following processes were put in place:

- training was conducted for all soldering operators and inspectors;
- peer audits were scheduled quarterly;
- a quality inspection point was added for all overhauled spring solder joints;
- process verification audits were scheduled on an annual basis; and
- rejected and reused components were to be completely segregated during disassembly, cleaning, and reassembly.

Operator

The operator revised the company's training program to ensure that flight crews fully complete the emergency evacuation checklist before ordering an evacuation.

The Calgary Airport Authority

Operations personnel from The Calgary Airport Authority and tenants of the Calgary International Airport discussed the hazards and mitigations associated with operation of ground vehicles in the proximity of deplaning passengers during emergency situations.

TSB Final Report A05P0298—Engine Failure—Descent into Terrain

On December 20, 2005, at 18:34 Pacific Standard Time (PST), a Mitsubishi MU-2B-36 aircraft took off from Runway 15 at the Terrace, B.C., airport for a courier flight to Vancouver, B.C. The left engine lost power shortly after takeoff. The aircraft descended, with a slight left bank, into trees and crashed about 1 600 ft east of the departure end of Runway 15, on a heading of 072° magnetic. The aircraft was destroyed by the impact and a post-crash fire, and the two pilots were fatally injured.

Findings as to causes and contributing factors

1. During the takeoff, the left engine combustion chamber plenum split open due to a fatigue crack. The rupture was so extensive that the engine flamed out.
2. The crew did not feather the left engine or retract the flaps, and the aircraft entered a moderate left-hand turn after takeoff; the resulting drag caused the aircraft to descend until it contacted trees.
3. The first officer's flying skills may have been challenged during the handling of the engine failure, and the checklist was conducted out of sequence, suggesting that there may have been uncertainty in the cockpit. A contributing factor may have been the captain's unfamiliarity with handling an emergency from the right seat.
4. The use of flap 20 for takeoff, although in accordance with company policy, contributed to the difficulty in handling the aircraft during the emergency.

Findings as to risk

1. The TPE331-series engine plenum is prone to developing cracks at bosses, particularly in areas where two bosses are in close proximity and a reinforcing weld has been made. Cracks that develop in this area cannot necessarily be detected by visual inspections or even by fluorescent penetrant inspections (FPI).
2. Because the wing was wet and the air temperature was at 0°C, it is possible that ice may have formed on top of the wing during the takeoff, degrading the wing's ability to generate lift.
3. Being required to conduct only flap 20 takeoffs increases the risk of an accident in the event of an engine problem immediately after takeoff.

Other finding

1. The plenum manufactured with a single machined casting, incorporating the P3 and bleed-air bosses, is an improvement over the non-single casting boss plenum; however, cracks may still develop at bosses elsewhere on the plenum.

Safety action taken

On July 6, 2006, the TSB issued Safety Advisory A060025-1 suggesting that Transport Canada (TC) may wish to remind MU-2B and other twin-engine operators of the importance of ensuring that the required checklist items are completed immediately after recognition that an engine has failed on takeoff.

On September 8, 2006, TC issued Service Difficulty Advisory (SDA) AV-2006-07 regarding Mitsubishi MU-2B cracked combustor plenums (Honeywell TPE-331-6-252M engines). The SDA recommended compliance with the manufacturer's (Honeywell) Service Bulletin (SB) TPE331-72-2023 to change the combustion chamber from a 3102613-1 (multi-casting boss plenum) to a 3102613-2 (single-casting boss plenum). TC also recommended that maintenance personnel be extra attentive to boss welds when inspecting TPE331-series engines for plenum cracks.

On November 14, 2006, the TSB re-issued Safety Advisory A060025-1 suggesting that TC may wish to remind MU-2B and other operators of the effect of flap settings on achieving a required climb gradient following an engine failure in varying ambient conditions.

On May 18, 2007, the TSB issued Safety Advisory A06P0298-D2-A2 (*Cracks in TPE331-Series Engine Plenum*). The advisory described the history of plenum cracking with the TPE331-series engine, particularly in areas where two bosses are in close proximity and a reinforcing weld has been made. Cracks that develop in this area cannot necessarily be detected by visual inspections or even by FPIs. The advisory suggested that TC may wish to advise commercial operators of the circumstances of this occurrence. Additionally, it suggested that TC may wish to consider the requirement for discussion with the U.S. Federal Aviation Administration (FAA) regarding the effectiveness of the maintenance instructions for identifying cracks in the TPE331-series engine plenum.

TSB Final Report A06F0014—Misaligned Takeoff

On January 30, 2006, an Airbus A319-114 with 84 passengers and 5 crew members on board, was on a scheduled flight from Las Vegas, Nev., to Montréal, Que. The aircraft was cleared to depart Runway 25R and the crew commenced a rolling takeoff at 00:15 Pacific Standard Time (PST). Shortly thereafter, both members of the flight crew realized that the aircraft was rolling on the asphalt runway shoulder instead of on the runway centreline. At approximately 65 knots indicated airspeed (KIAS), the pilot flying applied left rudder to realign the aircraft with the runway centreline and completed the takeoff. The flight continued to Montréal, where an uneventful landing was carried out. During the flight to Montréal, the crew advised company dispatch of the departure occurrence. Dispatch advised the Las Vegas tower that the aircraft may have damaged some runway edge lights during the take-off roll. Three runway edge lights were found damaged. The only damage noted on the aircraft was a cut on the left-hand nose-wheel tire. There were no injuries.

Finding as to causes and contributing factors

1. The pilot flying likely relied on peripheral vision to taxi the aircraft because of the requirement to maintain separation with the aircraft departing ahead. This, combined with the aerodrome markings, resulted in the misalignment of the aircraft and the initiation of the takeoff from the asphalt runway shoulder instead of the runway centreline.

Findings as to risk

1. A rolling takeoff reduces the crew's time for conducting a thorough outside visual check and verifying runway alignment before initiating the take-off roll.
2. Taxiway B1 and A2 centrelines curve onto the runway edge line. At night, this could result in pilots aligning their aircraft with the runway side stripe marking instead of with the runway centreline.
3. This occurrence was reported to company dispatch and air traffic services two hours after the event. During that time, debris left by the broken lights could have posed a hazard for other aircraft using Runway 25R.

Other finding

1. The other three similar events that happened on Runway 25R at the Las Vegas McCarran International Airport (KLAS) were not reported. Failure to declare such events deprives investigators of important data that could help to identify the contributing factors that lead to this type of event.

Safety action taken

The Las Vegas Airport Authority made modifications to the taxiway markings following the occurrence. At Taxiway B1, the radius of the taxiway centreline was extended past the runway edge line and now meets with the runway centreline in the displaced threshold arrow area. At Taxiway A2, the radius of the taxiway centreline that curves to the runway edge line was erased, and the taxiway centreline now extends to the threshold markings.

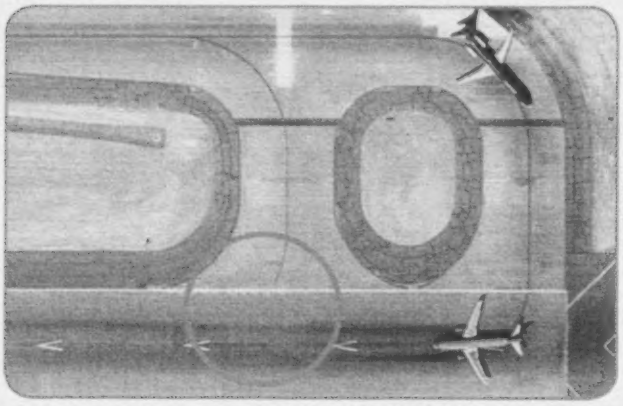


Photo: Google Maps

Circle shows Taxiway B1 centreline as it curved into the runway edge line, prior to the modification

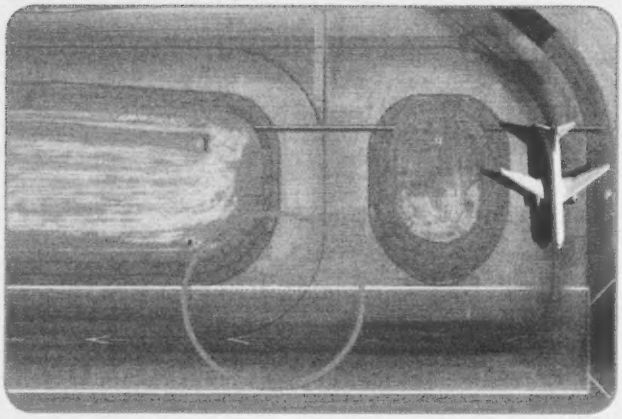


Photo: Google Maps

Circle shows Taxiway B1 with the radius of the taxiway centreline extending past the runway edge line and meeting with the runway centreline in the displaced threshold arrow area, after the modification

TSB Final Report A06P0036—Runway Overrun—Collision with Terrain

On March 8, 2006, a Piper PA-31-350 Chieftain departed from its home base at Vancouver, B.C., with two crew members on board. The aircraft was being repositioned to Powell River, B.C. (a 30-min flight), to commence a freight collection route. On arriving at Powell River, the crew joined the circuit straight-in to a right downwind for a visual approach to Runway 09. A weather system was passing through the area at the same time and the actual local winds were shifting from light southwesterly to gusty conditions (11 to 37 kt) from the northwest. The aircraft was lower and faster than normal during final approach, and it was not aligned with the runway. The crew completed an overshoot and set up for a second approach to the same runway.

On the second approach, at about 16:39 Pacific Standard Time (PST), the aircraft touched down at least halfway down the wet runway and began to hydroplane. At some point after the touchdown, engine power was added in an unsuccessful attempt to abort the landing and carry out an overshoot. The aircraft overran the end of the runway and crashed into an unprepared area within the airport property. The pilot-in-command suffered serious injuries and the first officer was fatally injured. A local resident called 9-1-1 and reported the accident shortly after it occurred. The pilot-in-command was attended by paramedics and eventually removed from the wreckage with the assistance of local firefighters. The aircraft was destroyed, but there was no fire. The emergency locator transmitter (ELT) was automatically activated, but the signal was weak and was not detected by the search and rescue satellite.

Findings as to causes and contributing factors

1. The downwind condition on approach contributed to the aircraft landing long and with a high ground speed. This, in combination with hydroplaning, prevented the crew from stopping the aircraft in the runway length remaining.
2. When the decision to abort the landing was made, there was insufficient distance remaining for the aircraft to accelerate to a sufficient airspeed to lift off.
3. The overrun area for Runway 09 complied with regulatory standards, but the obstacles and terrain contour beyond the overrun area contributed to the fatality, the severity of injuries, and the damage to the aircraft.

Finding as to risk

1. Alert Service Bulletin A25-1124A (dated 01 June 2000), which recommended replacing the inertia reel aluminium shaft with a steel shaft, was not completed, thus resulting in the risk of failure increasing over time.

Other findings

1. The weather station at the Powell River airport does not have any air-ground communication capability with which to pass the flight crew timely wind updates.
2. The decision to make a second approach was consistent with normal industry practice, in that the crew could continue with the intent to land while maintaining the option to break off the approach if they assessed that the conditions were becoming unsafe.

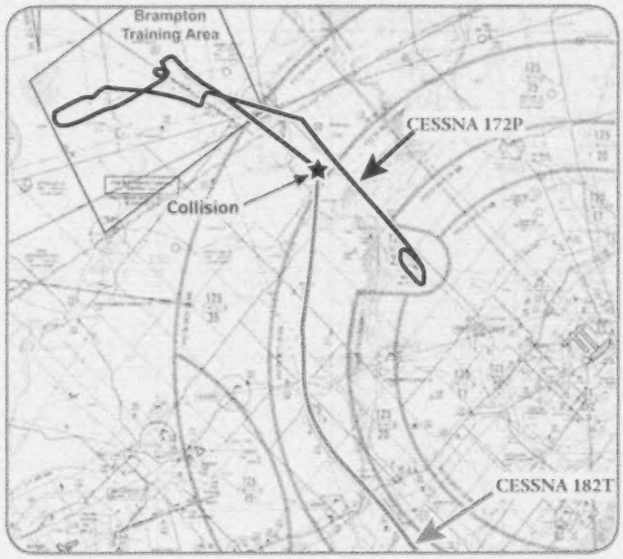
Safety action taken

The TSB forwarded a Safety Information Letter, dated 18 August 2006, to the Powell River airport operator. The letter addressed the terrain contour beyond the overrun area for Runway 09, reflecting the third item under "Findings as to causes and contributing factors."

TSB Final Report A06O0206—Mid-Air Collision

On August 4, 2006, two light airplanes collided in mid-air approximately 1 NM west of the town of Caledon, Ont. Both airplanes were operating in accordance with visual flight rules (VFR) in Class E airspace. The collision involved a Cessna 172P airplane operated by the Brampton Flying Club and being flown by an instructor and student, and a Cessna 182T airplane being flown by its owner. The Cessna 172P was southeastbound in a gradual descent, wings level. The Cessna 182T was northbound in straight and level flight. The angle between the tracks of the two airplanes was approximately 120°.

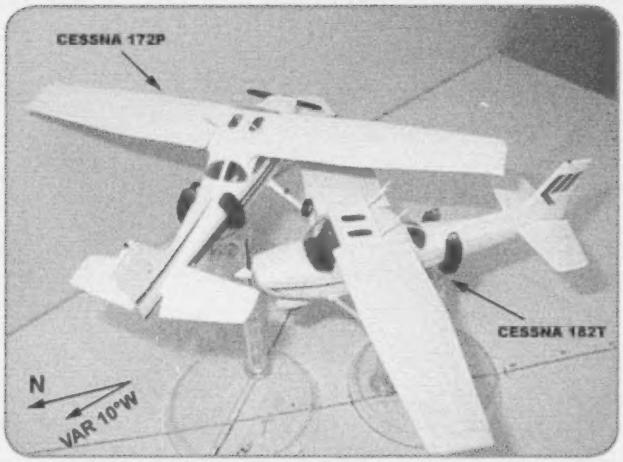
During the collision, the right wing was torn from the Cessna 182T and the airplane became uncontrollable. The Cessna 172P sustained damage to the nose and cockpit areas. Both airplanes crashed in close proximity to the point of collision. The three occupants of the airplanes received fatal injuries and both airplanes were destroyed. There was a small post-impact fire as a result of debris from one airplane severing an electrical power line. There was no fire in the main wreckage of either airplane. The accident took place at 12:34 Eastern Daylight Time (EDT) at 43°51'29.6"N, 080°1'12.8"W.



Airplane flight paths

Findings as to causes and contributing factors

1. Toronto, Ont., airspace design provides only limited vertical space beneath Class C airspace northwest of Toronto. Consequently, both airplanes were at the same altitude when their tracks intersected, and they collided.
2. There are inherent limitations and residual risk associated with the see-and-avoid principle; as a result, neither airplane saw the other in time to avert a mid-air collision.



Field of view for the crew from each airplane

Finding as to risk

1. There is a high residual risk of failure inherently associated with the unalerted see-and-avoid principle as the sole defence against mid-air collision in congested airspace.

Other findings

1. A technological means of alerting pilots to potential conflicts would augment the current see-and-avoid approach to averting mid-air collisions.
2. Canadian air traffic control radars do not support traffic information service (TIS); therefore, aircraft equipped with TIS cannot obtain traffic advisory information.
3. Light aircraft in Canada are not required to carry traffic alert and collision avoidance systems (TCAS) or any other form of traffic alerting system.
4. As a result of technological advances, practicable light aircraft/glider collision warning devices and secondary surveillance radar (SSR) transponders are being developed.
5. There has been little progress in implementing recommendations made by a safety review of VFR operations in Toronto airspace following a previous mid-air collision.

Safety action taken

NAV CANADA

NAV CANADA has taken the following actions since this accident, some of which are within the framework of a level of service review of the Montréal-Toronto-Windsor airspace corridor:

- In addition to the Claremont training area depictions, the latest Toronto area VFR charts (June 2007) have additional symbols depicting current parachute, ultralight, and flight training areas.
- The Toronto VFR terminal area (VTA) chart (July 2007) contains a new depiction to illustrate the final approach areas for the instrument flight rules (IFR) approaches serving Hamilton, with a cautionary note that pilots should be particularly vigilant in those areas for IFR aircraft on approach. The next cycle of the *Canada Flight Supplement* (CFS) will contain a number of these enhancements as well.
- On July 5, 2007, the Class E airspace above 6 500 ft within 65 NM of Toronto was designated as mandatory transponder airspace.
- Through 2006–2007, NAV CANADA, in conjunction with Transport Canada (TC), has continued to provide briefing/information sessions to VFR pilots about operations in the Toronto area.
- Through the airspace and services reviews consultative workgroups, NAV CANADA continues to facilitate a dialogue on what types of VFR routes and information would best serve the VFR community, including discussion about the information contained on the back of United States VTA charts, common area frequencies, publication of VFR practice areas and transition routes.
- A comprehensive flight planning Web page has been set up, including aerodrome diagrams and other flight planning products, ensuring that pilots have free access to comprehensive and up-to-date aeronautical data.
- An airspace and services review has been initiated in the Montréal-Toronto-Windsor corridor.

Brampton Flying Club

The Brampton Flying Club has taken the following safety actions:

- A pulse light system has been installed in all nine Cessna 172s and one Piper Seminole of the Brampton Flying Club fleet to enhance visibility to other aircraft. The remainder of the fleet will also be fitted with pulse lights.
- The Brampton Flying Club has met with NAV CANADA and requested a modest raising of the floor of Class C airspace to the north and west of the Brampton airport, and that the practice area be identified in a manner similar to the Claremont training area on the Toronto VTA and VFR navigation charts (VNC) and in the CFS.

Action required

Vertical Structure of Airspace

Research has shown that the probability of two aircraft being on a collision course is essentially a function of

traffic density, and the risk of collision is proportional to the square of this density. Measures such as improving aircraft conspicuousness, pilot scanning technique, and pilot traffic awareness can reduce risk, but they do not overcome the underlying physiological limitations that create the residual risk associated with unalerted see-and-avoid.

The current design of Toronto airspace in the vicinity where this accident occurred results in a concentration of traffic in a very small altitude band, immediately below the floor of Class C airspace, and immediately outside the radius at which the floor of Class C airspace steps down toward the Toronto/Lester B. Pearson International Airport. The combination of a ground elevation of 1 400 ft above sea level (ASL), flight at or above 1 000 ft above ground level (AGL), and a Class C floor of 2 500 ft ASL results in all traffic being concentrated vertically at the single altitude of 2 400 ft ASL. Changing the vertical structure of the airspace is one way of reducing this traffic concentration.

Radar data reviewed for this area during a 10-day period around the accident indicated a heavy volume of VFR traffic below the Class C floor, and several occasions where aircraft were within about 1 500 ft horizontally and 200 ft vertically of each other. In this and other congested airspaces, it has been shown that the see-and-avoid principle for VFR aircraft is not always sufficient to ensure the safety of flight. Therefore, there continues to be a high risk of a mid-air collision between aircraft operating under the VFR principle in that airspace.

Therefore, the TSB recommends that:

> The Department of Transport, in co-ordination with NAV CANADA, take steps to substantially reduce the risk of collision between VFR aircraft operating in Class E airspace surrounding the Toronto/Lester B. Pearson International Airport.
>
> A08-03

Safety concern

Collision-Protection Systems

At the present time, a large number of VFR-only aircraft are not equipped with Mode C transponders—devices that can alert pilots to other aircraft in their vicinity. Furthermore, the lack of other, available, and installed technological methods of alerting VFR pilots to the presence of other aircraft increases the risk of a mid-air collision, especially in congested airspace. A meaningful improvement to the ability to see-and-avoid other VFR aircraft requires a practicable, affordable method of alerting pilots to the proximity of conflicting traffic.

Recent developments in Europe, specifically with respect to low-cost, low-power, lightweight Light Aviation SSR Transponder (LAST) technology and collision-protection systems such as FLARM [FLARM is a trade name inspired by and derived from "FLight AlaRM."] that are compatible with automatic dependent surveillance broadcast (ADS-B), indicate that technological solutions are emerging that can accomplish both of these objectives. These new systems offer a means to reduce the risk of future mid-air collisions, provided they are integrated into the Canadian regulatory, airworthiness, airspace and navigation framework, and supported by general aviation.

Aircraft operating under VFR in congested airspace using solely the see-and-avoid principle as a means of avoiding one another run an increased risk of collision, as this and other mid-air accidents have demonstrated. This single point of defence has shown that it is not sufficient to ensure safety; however, the TSB believes that emerging technology that may be an affordable option to reduce this risk merits a serious look.

The TSB is concerned that, until technological solutions such as on-board collision-protection systems are mandated, a significant risk of collision between VFR aircraft will continue to exist in congested, high-density airspace areas in Canada. The TSB notes that the risk of collision will increase as this traffic continues to grow, and see-and-avoid remains the primary means of defence. In addition, the TSB recognizes that technological innovation is creating potential solutions that are both viable and economical.

The TSB appreciates that TC must examine all potential solutions before it can decide how best to recommend or mandate the adoption of one or more systems. On this basis, the TSB requests that TC take a lead role, in co-operation with industry, in examining technological solutions, with the eventual aim of broad-scale adoption.

There is a lot more to read on this extensive report, so we encourage readers to visit the TSB Web site. —Ed.

TSB Final Report A06C0154—Loss of Control—In-Flight Break-Up

On September 24, 2006, a Bell 204B helicopter was being used to conduct external load operations south of Stony Rapids, Sask., slinging drill rods between drill sites. Approximately three minutes into the flight, the pilot radioed that his side bubble window door had come open and that he was having difficulty holding the door.

The pilot released the sling load and the helicopter was observed climbing in a steep nose-up attitude before momentarily stopping on its tail, then dropping nose down. As the helicopter descended toward the ground, there was an explosion. The helicopter crashed approximately 22 NM southwest of Stony Rapids and was destroyed by impact forces and a post-crash fire.

The pilot, the sole occupant of the helicopter, was killed. The crash occurred during daylight hours at 18:11 Central Standard Time (CST).

Findings as to causes and contributing factors

1. The pilot's left-side bubble door opened during flight, likely because it was not closed and properly latched.
2. In the pilot's preoccupation with the open door, it is likely that he allowed the helicopter to enter a low-g condition, which led to mast bumping and the in-flight break-up of the helicopter.

Safety action taken

As a result of this occurrence, the operator has included additional documented training in its initial ground briefings to cover inadvertent door openings in flight and has fitted all of its helicopters with an automatic pneumatic door opener. This will prevent the doors from being closed unless they are fully latched. △

ACCIDENT SYNOPSES

Note: All reported aviation occurrences are assessed by the Transportation Safety Board of Canada (TSB). Each occurrence is assigned a class, from 1 to 5, which indicates the depth of investigation. A Class 5 consists of data collection pertaining to occurrences that do not meet the criteria of classes 1 through 4, and will be recorded for possible safety analysis, statistical reporting, or archival purposes. The narratives below, which occurred between May 1, 2008, and July 31, 2008, are all "Class 5," and are unlikely to be followed by a TSB Final Report.

— On May 1, 2008, a Saab SF340-A aircraft was on a scheduled cargo flight from Deer Lake, N.L., to Gander, N.L. On departure from Deer Lake, and when the landing gear was retracted, the hydraulic caution light illuminated. The crew completed the quick reference handbook (QRH) checklist, turned off the hydraulic pump, and diverted to St. John's, N.L., where maintenance was available. On approach to St. John's, the hydraulic pump switch was moved to the override position for gear extension and the gear extended to the down-and-locked position; however, the hydraulic quantity indication had now dropped to below the green arc. An uneventful landing was carried out on Runway 11 and the aircraft was slowed to a safe taxi speed by using reverse thrust. Since braking and nose wheel steering were still available, it was decided to taxi to the hangar. Upon reaching the hangar apron, the propellers were feathered; however, as the propellers were moving to the feather position, some thrust was produced and the aircraft continued moving forward. By this time, the hydraulic fluid was depleted and braking was no longer available. The aircraft continued to roll forward until it struck a hangar, causing substantial damage to the nose of the aircraft and minor damage to the hangar. There were no injuries to the crew. Maintenance found that a "banjo fitting" on the return side of the right main gear down lock actuator had failed. *TSB File A08A0062.*

— On May 4, 2008, a privately registered Cessna 210 Centurion was landing at Springbank, Alta., when the nose gear collapsed. A propeller strike followed. There was no injury to the lone occupant. Maintenance found the nose landing gear actuator failed on the rod end. A Service Difficulty Report (SDR) will be filed with Transport Canada. *TSB File A08W0082.*

— On May 11, 2008, a Let L33 Solo glider was on final approach to Runway 13 at Pendleton, Ont., when the pilot realized that the glider had insufficient altitude to reach the threshold of the runway. Trees and a swamp were located before the runway and the pilot decided to mush the glider into the trees to reduce the impact forces from the forced landing. The pilot evacuated the glider, and suffered minor injuries. The glider was substantially damaged. The weather was reported as: wind from 100° at 15 kt, gusting to 20 kt, and the sky was clear. The pilot

had accumulated approximately 700 hr of glider flying time and was experienced on the type.
TSB File A08O0119.

— On May 15, 2008, a Cessna 172N was taxiing north on Apron 1 for a departure from Runway 07 at Windsor, Ont. During the taxi, the left wing of the aircraft struck a fire truck that was parked at the fire hall. The wing of the aircraft was substantially damaged; there were no injuries. *TSB File A08O0130.*

— On May 16, 2008, a float-equipped DHC-3 Otter had just landed on the water at the Lac du Bonnet, Man., seaplane base (CJS9) when a gust of wind lifted the right wing. The left wing contacted the water and the aircraft overturned. The pilot and passenger were not injured. They evacuated the aircraft, and were picked up by a nearby boat. *TSB File A08C0104.*

— On May 18, 2008, an amateur-built Elem was landing at a private strip at Grassy Lake, Ont. During the landing, the aircraft bounced and the pilot attempted a go-around. During the go-around, the aircraft hit some wires located at the end of the strip and then impacted the ground. The pilot, the sole occupant, received minor injuries. *TSB File A08O0129.*

— On May 22, 2008, a Rans S-7S Courier advanced ultralight was taking off from a private airstrip in Berwick, N.S., on its inaugural flight. During the initial climb, at an altitude of approximately 500 ft, the engine (Rotax 912ULS) suddenly stopped. The pilot attempted to glide the aircraft to a nearby open field; however, the aircraft struck the tops of hardwood trees and came to rest about 30 ft above the ground, in the trees. The pilot, the sole occupant, was uninjured. The aircraft sustained substantial damage. *TSB File A08A0071.*

— On May 24, 2008, a Cessna 180B took off from Stonecliffe, Ont. The Cessna was declared missing on May 26, 2008. The next morning, May 27, 2008, the aircraft was found capsized in Paul Joncas Lake, Que. The two occupants sustained fatal injuries. The aircraft was significantly damaged. *TSB File A08Q0095.*

— On May 25, 2008, a Cessna 185E with a pilot and one passenger aboard had just taken off from Trois-Rivières, Que., when the engine (Teledyne Continental IO-520-D) quit. The pilot tried to return to land on the runway, but could not due to insufficient altitude. A forced landing was made in trees. No one was injured. The two occupants evacuated the aircraft, and walked to the airport. The aircraft sustained major damage. *TSB File A08Q0094.*

— On May 25, 2008, a Bell 206B helicopter was on a demonstration flight near Timmins, Ont. During a demonstrated autorotation with a power recovery, the aircraft impacted the ground in a tail-low attitude. The main rotor blades impacted the tail rotor drive shaft and severed the shaft. There were no injuries.
TSB File A08O0137.

— On May 30, 2008, a Cessna 172L with a pilot and one passenger aboard was on approach heading north toward Polen Lake. On final, the pilot realized that the wind was blowing from the south. The pilot conducted a go-around, and turned while pulling up. The aircraft descended and crashed in trees. The floatplane sustained significant damage. The occupants suffered minor injuries. *TSB File A08Q0098.*

— On May 30, 2008, a Cessna U206G floatplane was landing at Sparrowhawk Lake, Man., on a flight from Willow Point, Man., in calm wind/glassy water conditions. The aircraft touched down several times, and on the last touchdown, landed hard. The aircraft's right float struts collapsed and the aircraft nosed over, capsized and sank. The occupants exited the aircraft without injury, swam to shore and called for assistance via satellite phone. *TSB File A08C0114.*

— On May 30, 2008, a Texas Chuckbird X2 ultralight was on a local flight out of a farm airstrip near Charlie Lake, B.C. The ultralight was observed to enter a right turn at low altitude and descend almost vertically into trees. The pilot sustained fatal injuries and the ultralight was destroyed. Surface winds were described as strong and gusty. The pilot was unlicensed and the ultralight was reportedly modified from the original design. The TSB was not requested to attend the accident site and the district coroner has conducted a field examination of the wreckage using local aviation resources. To the extent the wreckage was examined, there was no evidence of an in-flight structural failure of the airframe. *TSB File A08W0100.*

— On June 1, 2008, several light aircraft were arriving at the uncontrolled Lacombe, Alta., airport to attend an annual fly-in breakfast. Two inbound ultralights were established in the circuit for Runway 16, one on short final and one turning base leg to final for the same runway, at about 400 ft above ground. Both ultralights had crossed midfield and joined the circuit abeam the midpoint of the runway on the downwind leg. When the lead ultralight was a few hundred feet from touchdown, an amateur-built Hirondelle PGK 1 joined the traffic pattern straight-in from the north, heading south at about 200 ft above ground on the approach to Runway 16,

behind the ultralight on short final and below the ultralight turning base to final. The distance between the lead ultralight and the Hirondelle closed rapidly. The Hirondelle suddenly banked sharply to the right and after about 90° of turn the nose dropped and the aircraft descended in a near vertical attitude into a level, cultivated barley field. The aircraft came to rest approximately 500 m northwest of the runway threshold. The aircraft was destroyed and the pilot sustained serious injuries. The aerodrome traffic frequency (122.8 MHz) was in use and was being monitored at the time of the occurrence. The aircraft was VHF-equipped; however, there had been no radio communication from the Hirondelle prior to the accident. *TSB File A08W0101.*

— On June 9, 2008, an amateur-built Comp Air Comp 4 was conducting the first flight since build completion, at the Springbank, Alta., airport. During departure on Runway 34, at approximately 150 ft above ground level (AGL), the engine (Subaru/Eggenfellner E6T/220) lost all power. The pilot declared an emergency, and the aircraft entered a steep right turn and crashed in the infield east of the runway. The pilot, who was the sole occupant, was fatally injured. *TSB File A08W0106.*

— On June 9, 2008, an Aerospatiale AS350-B2 helicopter was conducting training at the Villeneuve, Alta., airport. During a hydraulics-off exercise, control was lost and the helicopter contacted the ground, resulting in it rolling over on its left side. The helicopter was substantially damaged, but the two flight crew members sustained no injuries. *TSB File A08W0107.*

— On June 13, 2008, a float-equipped Cessna 182P with a pilot and one passenger aboard took off from St-Mathias, Que., bound for Réservoir Gouin, Que. Upon reaching Réservoir Gouin, the pilot was to land on glassy water. The pilot executed an approach at a low rate of descent, and then conducted a go-around. The aircraft did not climb fast enough and hit some trees. The floatplane capsized and came to a stop. The aircraft was significantly damaged. The two occupants suffered serious injuries. *TSB File A08Q0107.*

— On June 13, 2008, a Cameron hot air balloon Z-105 with a pilot and five passengers aboard took off from Iberville, Que., bound for Carignan/St-Hubert, Que. To avoid flying over St-Hubert at dusk, the pilot executed a precautionary landing in an industrial park on the outskirts of St-Hubert. The balloon made a hard landing in a paved parking lot, and then flipped on its side. The balloon was not damaged. One passenger sustained a serious injury. *TSB File A08Q0108.*

On June 22, 2008, a Pezetel SZD-55-1 glider was on final approach at Rockton, Ont., with the air brakes fully deployed. As the glider descended, the pilot pitched the nose up to climb over the trees on the approach path, but did not retract the air brakes. The nose up attitude and reduced airspeed resulted in the glider stalling and striking the trees in a steep nose-down angle. The pilot was extricated by witnesses and received no injuries. The glider was substantially damaged during the tree impact. *TSB File A08O0157.*

— On June 22, 2008, a Thorp T-18 aircraft was on a local flight about 3 NM northwest of Windsor, Ont., with the pilot and one passenger on board when, at an altitude of 2 000 ft above sea level (ASL), a loud bang was heard and the engine (Avco Lycoming IO-320-B1A) quit. The pilot searched for a landing area while the passenger, also a pilot, contacted ATC and advised them of the engine failure and that a forced landing was going to be performed. An unpaved service road between a railway yard and a residential street was chosen for the landing. As the aircraft descended, it struck hydro wires that were running across the road, and immediately after, the right wing struck a hydro pole located beside the road. The aircraft struck the ground and a fire erupted. The passenger evacuated the aircraft with some difficulty and received serious burn injuries. The pilot remained in the aircraft and was seriously burned. Due to the extent of the burns, the pilot died the following day.
TSB File A08O0158.

— On June 23, 2008, a Cessna 208 was taxiing on the apron at Saskatoon, Sask. The pilot turned the aircraft around a parked ATR42. The vertical stabilizer of the C208 struck the wing of the ATR42. Damage to the ATR42 was minor. The spar and front cap of the vertical stabilizer of the C208 were replaced. *TSB File A08C0135.*

— On June 26, 2008, a Bell 205B helicopter operating near Babin Lake, B.C., was on approach to pick up a load on the longline, when the engine (GE T-53-17B s/n LE-07727C) had an uncontained and catastrophic failure of the turbine section. The pilot landed the helicopter heavily, but was not injured. The skids and tail boom were damaged on landing, and the rotor blades suffered engine shrapnel damage. *TSB File A08P0195.*

— On June 29, 2008, at George River, Que., the pilot of an AS350B2 helicopter wanted to make boarding easier for a passenger, and chose to land with a wind blowing from the left. Upon touchdown, while the aircraft was still light on the landing gear, the pilot felt the right skid catch in vegetation. The aircraft suddenly freed itself, and

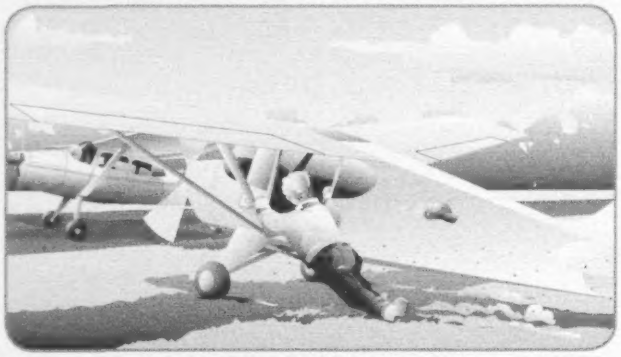
started to swing toward the left. The pilot immediately brought the helicopter back to the ground, and made a hard landing. Only the skids touched the ground. However, the impact was serious enough to wrinkle the surface of the tail boom. *TSB File A08Q0121.*

— On June 30, 2008, an Astar 350B helicopter was being used for an archaeological exploratory flight over the Steen River. During a left-hand turn toward the downwind leg, the pilot lost control of the aircraft. The helicopter made several 360° turns to the left and then crashed in 5 ft of water, about 30 ft from shore. The helicopter was severely damaged. However, the pilot and three passengers were not hurt, and walked a mile toward a shelter to request help. At the beginning of the turn, the helicopter was at an altitude of 200 ft and a speed of about 40-50 mph. The aircraft was at 97 percent of its maximum gross weight. The wind was blowing at 16 kt with gusts to 21 kt. In such conditions, a loss of tail rotor efficiency may occur if the aircraft loses speed. A decrease in collective pitch combined with a forward cyclic input usually helps regain control of the aircraft. Aircraft inspection showed no anomalies before the accident. *TSB File A08Q0118.*

— On July 2, 2008, an instructor was to demonstrate soft-field takeoffs and landings to a student-pilot at Lac Etchemin, Que. The instructor landed the Cessna 172 downwind on the first third of Runway 06. Although the instructor applied the breaks after landing, the aircraft did not decelerate sufficiently to prevent it from overrunning the runway. Realizing that the aircraft was about to overrun the runway, the instructor applied the left pedal and shut off the mixture. The aircraft came to a stop when it hit the grassy field and the forest at the edge of the hangars. The two occupants were not injured. The aircraft sustained significant damage. *TSB File A08Q0119.*

— On July 3, 2008, a Super Cyclone with a pilot and one passenger aboard had just taken off from Marina Venise, Que., for a local flight. During the initial climb, when the aircraft was at approximately 800 ft above sea level (ASL), the engine (Teledyne Continental IO-520D) quit. The pilot tried to restart the engine by switching fuel selectors, but was unsuccessful. The aircraft descended in a nose-low attitude toward Mille-Îles River. In order to decrease aircraft speed, the pilot selected full flaps. Because space was restricted, the landing was very hard, the floats buckled upwards, and the aircraft flipped over and came to a stop in an inverted position. The two occupants evacuated the aircraft and were rescued by recreational boaters. The occupants were taken to the hospital with minor injuries. *TSB File A08Q0124.*

On July 6, 2008, a Piper PA-17 was started by hand-propping at the Smith-Falls/Montague Airport, Ont. After the start, the aircraft began to move and the pilot was unable to reach the throttle or magnetos to stop it. The airplane traveled about 100 ft across the apron, dragging the pilot, before striking a parked Cessna 182. The Cessna 182's engine was running. Both airplanes sustained substantial damage. The occupants of the Cessna 182 were unhurt; the pilot of the PA-17 received minor injuries. *TSB File A08O0169.*



Artist's impression of the runaway PA-17 after the hand-propping went wrong

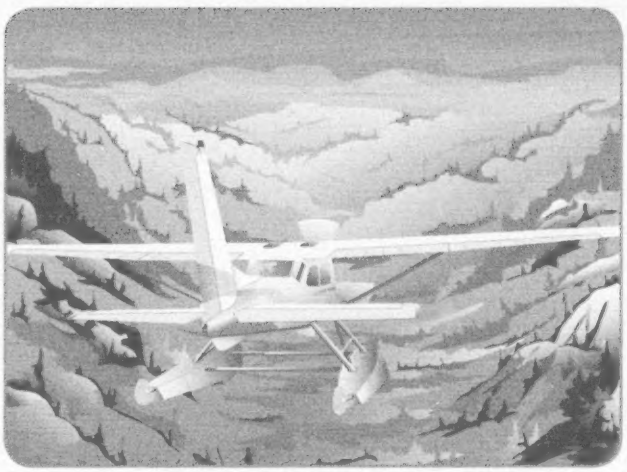
— On July 11, 2008, a Grumman G-164A Ag Cat was applying product to a field 8 NM east of Miniota, Man., when the engine (P&W R1340) suddenly lost power. The aircraft landed straight ahead into a field and overturned during the forced landing. The pilot was not injured and the aircraft sustained substantial damage. Air humidity levels were very high and the operator considers carburetor icing the likely reason for the engine power loss. The pilot had checked the carb heat before takeoff and was operating without carb heat at the time of the power loss. *TSB File A08C0159.*

— On July 13, 2008, a Cessna A188B was entering a field 2 NM southeast of Outlook, Sask., to spray a headland, when the aircraft collided with a power line. The pilot sustained serious injuries and the aircraft was substantially damaged. *TSB File A08C0148.*

— On July 16, 2008, an Aerospatiale AS350BA helicopter had just arrived at a drilling site approximately 38 NM west of Baker Lake, Nun. Four passengers had deplaned and the helicopter was idling. One of the passengers was unloading several 8- to 10-ft long sections of steel core tube shells. The tubes inadvertently came in contact with the main rotor. The rotor became unbalanced and the helicopter sustained substantial damage from rotor movement and vibration. The passenger and pilot sustained minor injuries. *TSB File A08C0151.* △

Looking Back: Flying Into a Mountain Trap

On August 13, 1984, a float-equipped Cessna 185D with four persons on board was being flown on a cross-country flight from Nelson, B.C., to Vernon, B.C. The Cessna failed to arrive at destination. An airliner picked up an emergency locator transmitter (ELT) signal; the subsequent search located the wreckage in a valley at 5 200 ft above sea level (ASL), approximately 10 NM northwest of Edgewood, B.C.



Common yet extremely insidious and dangerous situation for pilots flying in mountainous regions

The aircraft had struck the ground on a southeasterly heading in a steep nose-down attitude. On impact with the tree-covered terrain, both wings collapsed forward, and the fuselage folded over the engine at the firewall. All four occupants were killed.

Through a distance of about 10 mi., the terrain rises from 1 446 ft ASL—at the entrance to the valley—to 5 200 ft ASL—at the accident site. The terrain north and west of the accident site is higher still, rising to 7 412 ft ASL. The aircraft's route was up the valley, in a northwest direction, toward the rising terrain. At the time of the accident, the wind was from the southwest at 14 kt; the sky was clear; the visibility was in excess of 15 mi.; the temperature was 22°C.

The owner of the aircraft was in the right seat, and a less experienced pilot was occupying the left seat. It could not be determined who had been flying at the time of the accident. No flight plan had been filed, and there were no witnesses to the accident. The aircraft engine was operating at 2 100 rpm on impact, and appeared to be serviceable. The flight path into the trees and the damage sustained by the aircraft were both indicative of an aircraft in a spin.

In its report, the Transportation Safety Board of Canada (TSB) suggested that the pilot likely attempted to reverse course when he realized that the aircraft would not clear the terrain ahead, and, during this turn, the aircraft stalled and entered a spin. The TSB issued a single finding: the aircraft departed from controlled flight for undetermined reasons while navigating through a mountain valley with rising terrain ahead. △

From TSB File 84-P40044

Looking for *AIP Canada (ICAO)* Supplements and Aeronautical Information Circulars (AIC)?

As a reminder to all pilots and operators, AIP Canada (ICAO) *supplements and AICs are found on-line on the NAV CANADA Web site* (www.navcanada.ca). *Pilots and operators are strongly encouraged to stay up to date with these documents by visiting the NAV CANADA Web site, and following the link to "Aeronautical Information Products."*

European Initiative for Improved General Aviation (GA) Safety

by Clément Audard, Support Officer, Safety Team, European Aviation Safety Agency (EASA)

The European General Aviation Safety Team (EGAST) is a partnership that was created between the aviation community and authorities and is aimed at improving the level of GA safety in Europe. EGAST is the third component of the European Strategic Safety Initiative (ESSI).

General aviation is a priority for the European Aviation Safety Agency (EASA). Each year, EASA publishes a review on aviation safety in Europe; the 2007 edition reported 1 150 accidents causing 254 deaths in the GA sector.

EGAST was founded as part of an ambitious approach based on the partnership between the aviation community and authorities, responding to the need for a coordinated European effort.

EGAST was launched at EASA Headquarters in Cologne, Germany, on October 17, 2007. Building on the initiatives of each country and of the aviation community, EGAST creates a supportive forum for sharing best practices, and seeks to improve data sources, and promote safety.

EGAST faces a challenge since the term "general aviation" represents a community composed of, among others, the following sectors: business aviation, aerial work, air sports and recreational activities. Air sports and recreational activities alone include a wide variety of aircraft with very different characteristics such as airplanes, balloons, gliders and motorized ultralights.

As stated at the meeting in April 2008, "EGAST will promote and initiate for all sectors of GA best practices in order to improve safety [...]. The team may make non-binding recommendations [...]. In addition, specific objectives and priorities may be defined at sector level, depending on safety importance and available resources."

Composition and structure

EGAST is composed of representatives of aircraft manufacturers, national and European civil aviation authorities, the aviation community, accident investigators, research agencies, and national and international organizations such as the Institut pour l'amélioration de la sécurité de l'aviation générale (institute for improved GA safety) in France.

EGAST has some 75 participants and is organized in three levels of involvement:

- EGAST Level 1 is the core team that runs the project and is composed of about 20 members representing various GA sectors. They meet four times a year.
- EGAST Level 2 is composed of around 60 members who are actively involved in achieving the objectives and who meet every two years to comment on the work program and to provide direction.
- EGAST Level 3 represents the European GA community, which needs to be informed about the results.

EGAST Level 1 is comprised of the following members: Aéro-Club de France, Aircraft Owners and Pilots Association (AOPA) Czech Republic/Piper OK, a.s., Association of the Aviation Manufacturers/ Evektor Spol s.r.o., BRP Rotax GmbH & Co. KG, Civil Aviation Authority (CAA) United Kingdom, Civil Aviation Office of the Republic of Poland, Direction générale de l'Aviation civile (general civil aviation directorate), European Aviation Safety Agency (EASA), Ente Nazionale per l'Aviazione Civile (Italian Civil Aviation Authority), Eurocontrol, Europe Air Sports, European Airshow Council (EAC)/European Council for General Aviation Support, European Business Aviation Association (EBAA), European Microlight Federation, Honeywell, International Council of Aircraft Owner and Pilot Associations (IAOPA).

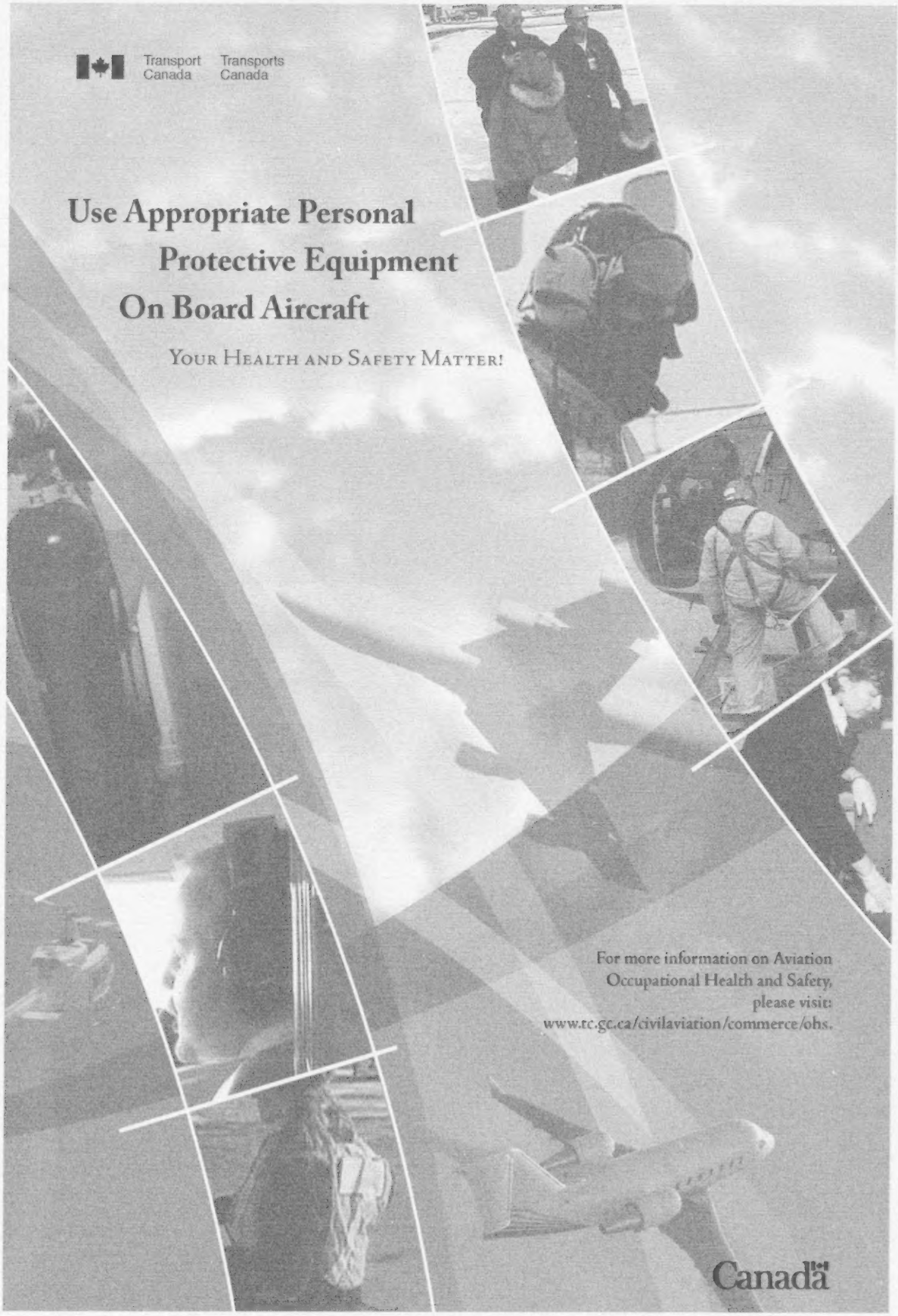
The lists of participants, meeting schedules, and other useful information are posted and updated on the EGAST's section of the EASA Web site at http://easa.europa.eu/essi/.

Cooperation

EGAST cooperates with the U.S. Federal Aviation Administration's (FAA) General Aviation Joint Steering Committee (GA-JSC) and the Eurocontrol Airspace Infringement Initiative. Particular interest is given to the work of the EASA MDM.032 group, which is developing a regulatory framework that is better adapted to the characteristics of GA in cooperation with the representatives of European GA.

Conclusion

EGAST is a partnership between the aviation community and the European authorities, which aims to promote or initiate in each GA sector the sharing of better practices in order to improve flight safety. It looks like they're off to a flying start! △


Transport Canada
Transports Canada
Use Appropriate Personal Protective Equipment On Board Aircraft
Your Health and Safety Matter!
For more information on Aviation Occupational Health and Safety, please visit: www.tc.gc.ca/civilaviation/commerce/ohs.
Canada

Note: This poster has been modified for ASL purposes. The original poster (TP 14527) is a bilingual product which is available through Transact (www.tc.gc.ca/Transact).

Transport Canada Transports Canada

TP 2228E-28
(01/2009)

TAKE FIVE...

for safety

Five minutes reading could save a life

PERSONAL MINIMUMS CHECKLISTS

Before the Task

1. Do I have the knowledge required to perform the task?
2. Do I have the technical data required to perform the task?
3. Have I performed the task before?
4. Do I have the proper tools and equipment required to perform the task?
5. Have I had the proper training required to support the job task?
6. Am I mentally prepared to perform the job task?
7. Am I physically prepared to perform the job task?
8. Have I taken the proper safety precautions to perform the task?
9. Do I have the required resources available to perform the tasks?
10. Have I researched the *Canadian Aviation Regulations* (CARs), Airworthiness Directives (AD), Service Bulletins (SB), and Service Difficulty Reports (SDR) to ensure compliance?

After the Task

1. Did I perform the task to the best of my abilities?
2. Is the result of the job task performed equal to or better than the original design?
3. Was the job task performed in accordance with appropriate data?
4. Did I use all the methods, techniques, and practices acceptable to the industry?
5. Did I perform the job task without pressure, stress and distractions?
6. Did I re-inspect my work or have someone inspect my work before returning the aircraft to service?
   Have the required "Independent Checks" of affected controls been accomplished and recorded?
7. Did I record the proper entries for the work performed?
8. Did I perform the operational checks after the work was completed?
9. Am I willing to sign off for the work performed?
10. Am I willing to fly in the aircraft once it is approved for the return to service?

Adapted from Aviation Safety Program, FAA

Canada